The RUBBER AGE

VOL. 26, NO. 9 FEBRUARY 10, 1930

LATE NEWS of the Industry

United States Rubber Consumption Figured at 32,000 Tons in January

OPERATIONS at domestic tire factories were resumed on a fairly wide scale last month, according to rubber consumption estimates made by members of the Rubber Exchange of New York. Consumption of crude rubber for the month of January is tentatively placed at 32,000 long tons, says a release from that body, which would exceed the December total by over 8,400 long tons. It will, however, fall appreciably below the amount consumed during January, 1929, when the figure totaled 43,002 long tons.

Tire and other rubber manufacturing companies at Akron and other centers have stepped up production considerably over the low level that prevailed during November and December and are believed to be running at about the rate of last September and October. This is between 60 and 65 per cent of plant capacity.

Leaders in the industry have predicted that rubber factory production would thus increase gradually from the slump at the end of 1929 and reach its peak again in the third quarter of the current year.

Directors of Falls Rubber Company Vote Merger with Cooper Corporation

DIRECTORS of the Falls Rubber Company, Cuyahoga Falls, O., and the Cooper Corporation, Cincinnati and Findlay, O., voted unanimously on January 31 to merge the two concerns. A plan for the consolidation of the two tire manufacturing firms into a single company with $4,000,000 assets will be submitted to the stockholders on February 17.

Common stockholders will receive one share of common stock of the new concern for each share of common stock held of either the Cooper or the Falls companies. The preferred stockholders of the Falls Rubber Company will receive two and one-half shares of the new common stock for each share of preferred stock held, and the preferred stockholders of the Cooper organization will receive one share of the new company's 7 per cent preferred and one-half share of the new common for each share held. The new company, it is reported, will have authorized $1,500,000 7 per cent preferred shares of $100 par value and 110,000 shares of no-par common stock.

Under the tentative plans, should the merger be consummated, the Falls plant will continue to make its Roadmaster tire and the Cooper Corporation will continue to manufacture the Cooper tire. The Cooper Corporation, organized about 10 years ago, has a daily capacity of 2,000 tires and also manufactures batteries, floor mats for automobiles and other sundries. It has one plant located at Findlay, having recently sold its battery manufacturing plant at Cincinnati to the Globe-Union Manufacturing Company, Milwaukee, Wis., for a consideration of $300,000 in cash and stock. Late last year the Cooper Corporation entered into a contract with the Seiberling Rubber Company to manufacture automobile batteries for the latter under the Seiberling name.

The Falls Rubber Company was organized in 1909 and has a daily capacity of about 2,000 tires. It has concentrated on the manufacture of the Roadmaster tire since last June when stockholders voted a note issue to provide capital for the development and expansion of markets for the new casing. The directors of the Falls Rubber Company last June rejected an offer by the India Tire & Rubber Company to acquire the Falls organization through an exchange of stock.

Falls stockholders at that time voted to increase the authorized amount of preferred stock to 6,000 shares of $100 par value and increased the authorized common stock from 24,000 no-par value shares to 100,000 no-par shares. The company has a funded debt of $350,000 of 7 per cent notes convertible into common stock at $7 per share.

I. J. Cooper is president of the Findlay company and J. F. Shaefer is vice-president and general manager. W. P. Cline is president and treasurer of the Falls Rubber Company, and the other officers include R. P. Bremer, chairman of the board; F. E. Dixon, vice-president and assistant treasurer; and G. C. Holgate, secretary. W. P. Lerch, who came to Falls from the India Tire & Rubber Company last fall, will continue in charge of production at that plant, and Frank Millhoff, now assistant to President Cline, is expected to become sales manager with the merger.

The combined assets of the two companies would total $4,000,000, of which $2,100,000 would be current compared with $625,000 of current liabilities. Working capital would total $1,500,000, while combined sales would be between $6,000,000 and $7,000,000.

Firestone Completes New Addition To Its Storage Battery Factory

THE Firestone Battery Company, subsidiary of the Firestone Tire & Rubber Company, has completed the construction of a new addition to its plant at Akron, O., involving a cost of $50,000 for building and equipment, and coming within a few months after the completion of the original battery plant at a cost of $200,000. Due to demand the battery plant is running 24 hours a day, three shifts, and it has been announced that Firestone plans other plants in other parts of the country, including one to be built soon on the Pacific coast.

The new addition, on the west end of the battery plant, which is adjacent to the Firestone Steel Products Company, will be used for the manufacture and chemical treatment of separators. The building, which was made ready for occupancy on February 1, is two stories high.

The Firestone battery plant is outstanding in the industry for its plan of manufacture, which is totally different from that of other battery plants. The plant turns out approximately three times as many batteries per square foot of floor space as other battery plants. Having about 52,000 square feet of floor space, including the addition, the plant is equipped with machinery practically all of which is designed and manufactured in the Firestone mechanical building, a complete machine manufacturing plant in itself.

The company this year will manufacture batteries for every type of automobile, including in all 23 passenger car sizes or types and 17 for trucks and buses. The plant already employs 400 men, and this force will be increased. The product conforms in general with other batteries, except for some features of design, quality, and the fact that Firestone uses only the hard rubber cases, which are claimed to be stronger and more chemical proof than composition cases. The better of the two Firestone brands of batteries has rubber separators.

The officers of the Firestone Battery Company are Harvey S. Firestone, president; W. A. Baker, vice-president and general manager; H. S. Firestone, Jr., vice-president; B. M. Robinson, secretary; J. J. Shea, treasurer; H. W. Hooper, assistant secretary and assistant treasurer.

Miller Rubber Company Stockholders Vote on Goodrich Offer February 17

WHETHER the common and preferred stockholders of the Miller Rubber Company will agree to the terms of the recent offer made by the B. F. Goodrich Company will be determined at a meeting which has been called for February 17. Approval of two-thirds of both classes of Miller stockholders will be necessary to ratify the offer of 113,504 Goodrich common shares, worth $5,206,996 as of February 1, for the assets of the Miller Company.

By the terms of exchange worked out by committees of Miller stockholders, one share of Goodrich common will be given for 11 shares of Miller common and between seven-tenths and eight-tenths of a share of Goodrich common will be given for one share of Miller preferred. Fractional shares of Goodrich common stock will not be allotted, but such fractional holdings will be paid for in scrip.

Proxy forms together with a copy of the Miller Company's consolidated balance sheet as of November 30, 1929, have been mailed to all stockholders, but no report has as yet been made on the percentage of returns received. "As a practical matter," said R. R. Jennings, assistant secretary of the Miller Company, in a letter to stockholders, "the carrying out of the sale may be dependent upon almost unanimous approval of the preferred shareholders."

The report of the Miller Rubber Company and subsidiaries for the 11 months ended November 30, 1929, shows a net loss of $819,177 after taxes and charges, but before inventory adjustments. In the year ended December 31, 1928, the company reported a net loss of $3,434,907 after depreciation, interest, inventory adjustments, etc. Accumulated preferred dividends on November 30, 1929, amounted to $1,578,822, no payments having been made on the senior stock since early 1928.

The consolidated balance sheet of the Miller Rubber Company and subsidiaries as of November 30, 1929, follows:

Assets: Land, buildings, machinery and equipment, less depreciation $7,672,223; real estate not used in operations $413,712; patents $1; cash $1,390,419; accounts, notes and acceptances receivable $3,650,701; inventories $6,103,736; other assets $164,055; deferred charges $191,075; total $19,585,922.

Liabilities: 8 per cent cumulative preferred stock $11,277,300; common stock (represented by 260,312 no-par shares) $5,201,100; profit and loss deficit $3,126,701; notes payable $5,150,000; accounts payable and accrued taxes $1,030,320; subsidiary mortgage payable $47,650; minority interest in subsidiaries $6,253; total $19,585,922.

The committee that has been representing the Miller preferred stockholders in the negotiations included George D. Bates, chairman of the First-City Trust & Savings Bank; Jerome Dauby, president and general manager of the M. O'Neil Company; and W. E. Slabaugh, of the law firm of Slabaugh, Seiberling, Huber & Guinther. Representing the common shareholders were William J. Ruof, executive vice-president of the Central-Depositors Bank & Trust Company; Stanley Harris, president of the National Rubber Machinery Company; and George Groman, manager of the Akron office of Prince & Whitley, brokers.

General Tire & Rubber Company Shows Increase of Assets During Past Year

FOLLOWING the completion of the annual audit, the General Tire & Rubber Company has made public its consolidated balance sheet, as of November 30, 1929, which shows total assets of $15,537,062 as compared with $12,432,328 a year previous. Only about one-third of the company's present assets, or $5,323,227, is represented by inventory, including raw materials and goods in process and finished.

Current assets totaled $10,490,062 and current liabilities $3,217,643, as contrasted with $10,207,232 and $1,102,680, respectively, on November 30, 1928. The value of the company's land, buildings, machinery, equipment, etc., less reserve for depreciation, is given as $2,887,089, the increase of $671,022 over the previous year being due to the expansion program carried out in 1929. Patents are carried on the books of the company at the nominal value of $1.

Notes and accounts receivable amount to nearly twice the notes which are payable to banks, the figures being $4,109,179 and $2,300,000, respectively. A similar ratio exists between cash on hand and in banks and accounts payable. Cash is reported as $1,057,656, while accounts payable, not due, including payroll, amount to $473,211. The surplus at the end of the fiscal year had increased from $5,902,698 to $6,779,918.

The 83,599 shares of $25 par value common stock are carried on the company's books at $2,089,975, while the pre-

ferred shares outstanding amount to $3,343,400. The common stock of the company has been currently selling on the Cleveland Stock Exchange at about $160 a share, as compared with a 1929 high and low of 298 and 236.

As previously reported, gross sales for the year were $27,200,160 and net profits $1,970,000. Dividends of $6 were paid on the common stock during the year and the usual preferred dividend requirements were met, the company never having failed since its organization to pay in cash its regular dividends on both classes of stock.

The balance sheet of the company as of November 30, 1929, compares as follows:

Assets

	1929	1928
*Land, buildings, machinery, equipment, etc.	$2,877,089	$2,206,067
Cash	1,057,656	779,791
Notes and accounts receivable	4,109,179	5,377,086
Inventories	5,323,227	4,050,355
Investments and advances	2,076,987	.....
Patents	1	1
Deferred charges	92,923	19,028
Total	$15,537,062	$12,432,328

Liabilities

	1929	1928
Preferred stock	$3,343,400	$3,360,100
Common stock	2,089,975	2,066,850
Notes payable	2,300,000	.....
Accounts payable	473,212	694,944
Federal tax reserve	191,271	199,646
Reserve for accrued taxes, etc.	253,161	208,090
Mortgages payable	106,125	.....
Surplus	6,779,918	5,902,698
Total	$15,537,062	$12,432,328

*After depreciation.

Rubber Heel and Sole Manufacturers Vote to Adopt New Trade Practices

AT A well attended meeting of the Heel and Sole Division of the Rubber Manufacturers Association, Inc., at the Hotel Copley-Plaza, Boston, Mass., on January 16, matters of general interest to rubber heel and sole manufacturers were discussed. R. H. Goebel, assistant secretary of the Rubber Manufacturers Association, Inc., was elected chairman of the Heel and Sole Division for the ensuing year.

The Division recommended to all members that, with the exception of solicitations received from projects local to the municipalities in which the manufacturing plants of members are located, all requests for cash contributions or merchandise donations, that is to philanthropic, charitable, commercial, civic or other enterprises, be referred to the office of the Rubber Manufacturers Association for attention as industry rather than as individual company matters. This policy is similar to that adopted by other manufacturing divisions of the industry.

The division discussed the practice of giving away goods in excess of orders and adopted a resolution condemning it as an unsound trade practice which might well be discontinued with consequent benefit to all factors in the trade. The furnishing of shoe repair tags to the findings and repair trade free of cost was discussed. The Division expressed the opinion that it is a wasteful practice and recommended that such tags should not be furnished at less than actual cost.

The Heel and Sole Division adopted a recommendation to all manufacturers that they discontinue purchasing or contributing for space, or exhibiting their goods in any way in connection with leather footwear style shows. This policy is similar to that adopted by other divisions in the industry. The practice of paying commissions to jobbers' salesmen was considered an unfair and unsound trade practice and the Division recommended that it be immediately discontinued.

The Division also recommended that members discontinue the practice of contributing for advertising space in catalogues, or any other publications issued or published by any jobber or retail customer and paying for advertising space in newspapers or magazines which has been contracted for or is controlled by customers.

U. S. Rubber Wage Dismissal Policy Explained at Personnel Conference

THE United States Rubber Company is now paying a dismissal wage when, due to reorganization, a factory is permanently closed or a process definitely discontinued," declared Miss E. H. Little, assistant supervisor of industrial relations of that company, before the Personnel Conference of the American Management Association at Cleveland, O., on January 31, in a paper explaining the treatment by the company of long time employes whose services were terminated as a result of the concentration of the company's manufacturing activities in fewer plants.

"The dismissal wage is paid on the basis of one week's pay for each year of employment to persons with 15 years of service and to those 45 years of age with 10 years of service. In closing four factories, 502 persons have benefited, in amounts varying from $125 to $2,000.

"Under modern methods of conducting industrial enterprises, running a factory is no simple endeavor, but to shut it down permanently, in a well-ordered and efficient manner is a far more difficult task. Even with our American notions of mobility, a factory of any size represents an institution in the local community. Its closing means the breaking of old associations, the scattering of families and very generally results in radical readjustments for everyone intimately concerned. The word most frequently used by our old employes as they come around to see us is 'shock.' And a short conversation will convince you that only such a term can adequately express their reactions to the event. To no group is the shock greater than to the middle-aged group of long-service workers. They are inticipating many more years of employment; learning a new job is beyond their imagniation; and even a change in the location of their work is looked upon with dread.

"Two parts of the policy which we have adopted in closing factories have proved their value as shock absorbers. One is the month's notice, and the other is the dismissal wage. The beneficiaries of the latter are largely this middle-aged group. The month's notice provides for mental re-adjustment, and the dismissal wage, in some measure, for economic re-adjustment, and the mental readjustment is an important factor in making the economic readjustment. From my experience, I should hate to close down any factory with a large group of old-time workers without giving a month's notice, but I should dislike even more to give a month's notice, if I were not operating under a policy of a dismissal wage. Its direct effect on the factory is steadying.

"To the supervisory force, particularly, it becomes the source of moral courage, not only for themselves in listening to the stories of their time-proven workers, but also as an effective appeal for acts of loyalty under extremely difficult conditions and at a time when loyalty means dollars, where before it meant cents. With the loss of a job staring everyone in the face, a dismissal wage is a very tangible evidence of a company's appreciation of loyalty and service. Our experience has been that not only the direct beneficiaries respond to that appeal, but they also carry along with them those others whose leaders they naturally are. It is a potent force in forming public opin-

ion within the plant. The result is a fostering of pride and morale under circumstances where indifference and demoralization would be normal."

Swinehart Tire and Rubber Company Will Be Reopened by New Management

THE Swinehart Tire & Rubber Company, Akron, O., which has been closed since last October because of bankruptcy proceedings, will resume operations this month with more than 300 men employed in its departments. This resumption of activities follows the sale of the plant and equipment last month to Thomas F. Walsh, former president of the company, for $53,000.

Mr. Walsh's bid was made on January 15 to Robert Guinther, receiver of the company, and was definitely confirmed three days later by Harry L. Snyder, Akron referee in bankruptcy. A protest on the sale of the property was made by Samuel Kramer, attorney, acting in behalf of clients interested in the property, who claimed that "the price the plant brought was grossly inadequate," but Mr. Kramer declined to file a bond of $25,000 to back up his objection.

The Swinehart company was forced into bankruptcy by a petition filed by the Poncet-Davis Company and the C. P. Hall Company, both of Akron, and the English Mica Company, of New York City. Liabilities of $450,000 were shown in the petition, which was filed July 25, 1929, the largest single item of indebtedness being $310,000 in notes to the First Trust & Savings Bank and the Central Savings & Trust Company, both of Akron. These notes had been personally endorsed by Mr. Walsh, and it is presumed, according to the receiver, that he will make good the amount of the notes in addition to making payment of $53,000 for distribution among creditors.

The appraisal of the Swinehart plant and equipment was approximately $100,000. With the sale confirmed on January 18, the large assets, with the exception of "accounts receivable," all have been liquidated, Mr. Guinther said. The sale involved land, buildings, equipment and patents. The tire stock left when the company suspended manufacturing operations has been sold.

The Swinehart company was organized at Akron in 1904 and started in the rubber business manufacturing solid tires. Later it turned to the manufacture of pneumatic tires, but the bulk of its business has been in the solid tire line. Mr. Walsh has been president of the company since 1921, when a line of cushion tires was added. The company purchased the Erie Rubber Company early last year, buying out the business, patents and plans of the firm, without taking over its former factory at Sandusky.

India Tire & Rubber Company Plans To Sell $1,300,000 in New Notes

STOCKHOLDERS of the India Tire & Rubber Company are scheduled to vote on February 10 on a new financing plan, involving the issuance of $1,300,000 in medium term notes. Directors of the company approved the plan late last month, and the amount is already said to be underwritten or sold by a banking syndicate.

Funds obtained from the sale of these notes will be used to cancel the company's floating indebtedness and to provide for factory and distribution expansions. India sells exclusively through dealers on a uniform national plan. The company has a strong dealer organization in the United States and has sales outlets for its products in 54 foreign countries. The company manufactures only one grade of "super" tires of all standard sizes, but concentrates on pneumatic casings for buses and other commercial vehicles.

The company's plant, located on the Wheeling & Lake Erie Railroad at Mogadore, O., has a daily capacity of between 1,800 and 2,000 tires daily. The company has about $489,600 of $100 par value preferred stock outstanding, and about 84,000 shares of the 125,000 shares of authorized common stock have been distributed. An associated company, the India Tyre & Rubber Company, Ltd., has a plant at Inchinnan, Scotland.

Reports that the company was planning new financing caused a sharp upturn in the company's common stock on the Cleveland Stock Exchange, raising it from its low of 8½ to a peak of 18 on January 31. During 1929, the stock rose to a high of 73 in January and declined slowly to a low of 16½ near the end of the year.

Officers of the India Tire & Rubber Company include J. M. Alderfer, chairman of the board; W. G. Klauss, president; G. W. Merz, vice-president; S. W. Alderfer, secretary; and W. G. Vieh, treasurer. Directors include A. T. Kingsbury, H. Lloyd Williams, P. C. Searles, T. E. Borton, and Messrs. Merz, Klauss and J. M. Alderfer.

Drop in Crude Rubber Price Causes Lowering of Estimates of Earnings

DUE to the four-cent decline in the price of crude rubber and the sharp falling off in business which occurred in the last two months of 1929, estimates of rubber company earnings for that year have undergone a downward revision. Whereas it was previously estimated that the Goodyear Tire & Rubber Company would show a net of close to $22,500,000, or $12 a share on the common stock, it is now figured that the company's income will be shown to have been between $18,800,000 and $19,500,000, or between $9.50 and $10 a common share. The B. F. Goodrich Company was previously estimated to be likely to show about $8 a share on its common stock, but the company announced on February 5 that its earnings were approximately $7,400,000, equal to $5.49 a share on 926,396 average number of shares outstanding during 1929.

In the case of Goodyear, the company's size and distance from the source of crude rubber makes it necessary to have on hand a supply of rubber so large that a drop of only two cents a pound in the market price of the commodity at the end of the year means a writing down of inventory of an amount equal to 50 cents a share on the common. Its 1929 earnings on 1,398,126 shares of common stock will compare with a net profit of $7.31 a share on 1,057,199 shares in 1928 and with $9.02 a share on 830,249 shares in 1927. With the one exception of 1925, when, through greatly enhanced inventory valuation, net profit exceeded $21,000,000, 1929 earnings were the largest in Goodyear's history.

The B. F. Goodrich Company's common stock was increased materially during the year and now totals 1,053,638 shares as against 745,910 shares as of December 31, 1928. About 208,000 shares were sold at $81 a share last spring and 100,000 shares issued in exchange for Hood Rubber Company common on a one-for-two basis. The Hood Rubber acquisition has proved very profitable because footwear business, due to the early and widespread snow storms, has been the best in some years.

Instead of the 1928 balance of $1.50 a share, which spelled a deficit of more than $1,800,000 after common dividends, Goodrich will report a per-share balance covering the $4 dividend rate by at least a 35 per cent margin.

(Other news of the industry will be found on Pages 491-497.)

Native Rubber Cultivation *in the* Dutch East Indies

Area Now Planted in Native Holdings Totals Over 1,000,000 Acres of Which Approximately 400,000 Are in Bearing—Quality of Rubber Improving

By HENDRIK DE LEEUW

A NEW economic situation has developed in the Dutch East Indies as a result of the native plantation developments in crude rubber. Something unforeseen even 10 years ago has occurred. European owned rubber estates, heretofore supreme in extent of development and number of acres under cultivation, are now being rapidly superseded in volume of output by native or Asiatic owned holdings. The native holdings are producing an ever increasing yield approaching close to the total combined output of the well-organized and extensively developed foreign holdings. While the areas in the Dutch East Indies now under native ownership as contrasted with European ownership vary in different localities, in the aggregate they represent over 60 per cent of the total planted acreage and this percentage will mean a steadily increasing output as the new acreage, planted since 1925, comes into bearing. Today Dutch native rubber production presents a situation well worthy of profound consideration on the part of European owned rubber estates, both in the Dutch and British rubber producing areas of the Middle East.

The native culture of rubber in the Dutch East Indies, which has only developed within a comparatively short space of time, is an agricultural phenomenon of such magnitude that its economic significance and eventual results cannot be easily gauged. The industry has reached gigantic proportions, particularly in the Djambi region, in southern and central Sumatra, and eastern and southeastern Borneo.

It is relatively hard to believe that in such a short stretch of time which really only goes back to 1922, the date when the Stevenson restriction scheme went into force, the region around Djambi, a comparatively remote section and where less than a decade or so ago Dutch troops were sent to maintain order, now has risen to a position which promises a great rubber growing future.

If figures could tell any tale, it might be of interest to bring out the fact that in 1921 the exports from all native regions of the Dutch East Indies were only 5,400 tons of dry rubber, as compared with the official estimate for 1929 of around 110,000 tons.

The Unshaded Portions of the Above Map Show the Rubber Growing Regions of the Dutch East Indies Where the Native Plantings Exceed in Area More Than 1,000,000 Acres

During the period of high rubber prices, in the days of the Stevenson scheme, the whole economic life in the rubber regions of Sumatra and Borneo underwent great changes not only in the matter of wages, which increased considerably and consequently brought about a new "prosperity" among the tapping coolies, but the domestic life of the tappers and the owners of small "paggers" or rubber gardens

has experienced a change and standards of living have risen as a result of this new economic development.

So, for instance, in Palembang, where the natives always had been used to a certain amount of prosperity and the handling of money in contrast to other areas, the number of American motor cars, which at the end of 1922 had only reached 300, in 1926 had reached 1300, many of which were of the more expensive makes. The desire for luxury goods at times had become alarming and it was not at all unusual to see some natives parade the small villages in patent leather shoes in contrast with ten years ago when these same people walked barefooted.

When we turn to Borneo, this vast land of jungles and "rimba" presented a somewhat similar picture. The standards of living of the inhabitants in these sections changed in even a more marked degree. By way of illustration, within the last few years about 700 motor cars have been imported into Banjermassin, in the southern part of Borneo, while in Kloea, the real center of the native rubber culture, over 10,000 bicycles were imported. In Pontianak, there was an equal demand for pleasure motor cars. The chief buyers were native owners of small rubber areas.

Interior View of a Native Rubber Garden Near Djambi

Rubber was being grown by the natives to the sacrifice of such local staples as rice, maize, potatoes and greens and the situation is tending to put the Dutch East Indian government on their guard. Conditions within the last year or two have changed somewhat, due to the dropping market in crude rubber and with the decline in their income from rubber culture the natives have partially renewed their plantings of rice and maize.

Restriction Encouraged Native Plantings

Within the past seven years and in fact dating from the first year of the restriction policy of Great Britain, the Dutch East Indies have enjoyed a highly profitable return on their crude rubber plantations. The estates in the Dutch area benefitted to the utmost as a result of the inflexibility of the operation of the Stevenson Act, but particularly have the natives, holding 5 acres or more, reaped a harvest and even in the face of the discouraging market prices which prevailed during 1929, the native planter, especially those working a family area, will have marketed a maximum output with a fairly profitable return. In the case of the family properties, tapping continues with the greatest possible cutting to secure the maximum yield, even to the serious detriment of the trees, and in distinction with the native estate or holding where coolies are employed on a 50-50 basis, the holding worked solely by the individual family, will return a profit no matter how low a price is obtained for the rubber output.

No one can really blame the native for leaving the old drudgery of rice and other cultivations for the more lucrative Hevea culture, which under the methods of native cultivation, requires little care and once his seeds or cuttings have been planted out on his dry "ladangs," he leaves the rest for Nature to take care of and in three or four years he expects to get his easy reward.

But careless methods of tapping, in many instances sacrificing the future for more immediate results, has caused destruction in some tapping areas and the possibility of bark renewal, to the extent of bringing these trees back to normal yield, is problematical.

Another characteristic difference in methods between the European managed estates and the native holdings is the low daily production of the tapper on the latter, causing a high direct tapping overhead,—a daily production of 3½ pounds being considered normal, while on the European managed estates an average of 14 pounds is expected. But notwithstanding the high direct tapping overhead of the native holdings, by which is meant the difference between 3½ and 14 pounds daily production, the native will always be able to compete with estate rubber as the tapping overhead is really the only direct operating cost. The native will therefore continue to tap rubber and stay in the market as long as prices will give him even the slightest profit.

A native rubber garden presents a very contrasting picture as regards methods of operation from the methods in vogue on the European owned plantations. Neither seed selection, budgrafting nor any other new scientific development for the improvement of output, occurs to the native owner's mind. He takes the seeds or cuttings, that he has for the asking from the existant gardens of his neighbors, and plants them out, often in too close a formation according to the best estate practice, and starts tapping as soon as he thinks there is something to tap. Cover crops are sometimes cultivated but not as a rule; manuring is seldom if ever done and the term "clean weeding" does not have a place in the native's vocabulary.

Profits on Native Holdings

As for the monetary return on native holdings it is difficult to arrive at any average figure. On a holding of 100 trees that are in tapping in their sixth year, only one "katti" or 1.33 pounds of wet rubber is produced per day. On a garden of 600 trees, which can be taken as an average native holding, using the above average daily production, and assuming an average of 200 tapping days, about 1,200 "katti" or 1596 pounds of wet rubber, or approximately 1064 pounds of dry rubber per year would be produced. There is a difference of about 8 cents U. S. currency between what the current New York market price and the price paid the native, so that assuming the market in New York was 20 cents per pound, the native would receive about 12 cents per pound or approximately $127.68, U. S. currency, on his year's crop,—a fair sum under the local wage scales. However, this is not all net, for the cost of his coagulating ingredients, tapping knives, cups and spouts must be deducted, but these will only come to a few dollars.

Native rubber is mostly traded to those great peddlers of the East, the Chinese, but even in this merchandising phase of the industry the native is beginning to fight for predominance and is apparently succeeding.

The trading in native rubber is an interesting study in cutthroat bartering. The native producer and the numerous agents and middlemen must fight hard for a just price. Until recently, trading proceeded somewhat as follows:

The rubber was first weighed with a "Datjing" (a Chinese weight). But as the rubber started up the river, these "Datjings" due to loss in water content and alum and dirt, would show an ever lessening weight, so that 100 pounds weighed at original "pasar" or market place, would weigh only 70 pounds when it reached the wholesale merchant and consequently the wholesaler only pays for that amount. He in turn threw it in the water and to his delight found in a few weeks that the weight had increased again 10 to 20 per cent. His profit, irrespective of price fluctuations, was 15 per cent more on account of the wrong weight at the original point of purchase, plus 10 to 20 per cent additional profit gained by the increase in water content. The Chinese trader would then enter the picture and also get his profit by the simple manner of crafty handling of the "datjings," of which no two are alike. The conditions have improved somewhat through pressure on the part of the government in the last few years, but the native still suffers to some extent from such intricate and crafty methods of trading.

Output for 1930 May Total 140,000 Tons

Native rubber production has exceeded each serious estimate. Some well-known authorities, for instance, estimated the production for 1924 as 32,000 tons, while it was actually closer to 52,000 tons. Estimates made several years ago for the probable production for 1930 placed the figure at 38,000 tons, whereas we can safely look for a 140,000 ton production and if prices do not show any marked decline from the already low levels, a production of 175,000 tons can be looked for in 1931.

Previously there has been a tendency to minimize the importance of the native holdings and their ability to develop any great total output. As a consequence the rubber trading circles in general and rubber estate shareholders have been left in ignorance of the potentialities of native rubber, and have only recently awakened to the stark reality of the situation, not only to their amazement but dismay. No satisfactory explanation can be given for this failure to visualize the coming importance of this native rubber industry. Time and again this matter has been brought to the attention of the trade but has been dismissed as unimportant because of lack of authoritative data and because of a most peculiar refusal on the part of the European plantation estate managers and agents to regard the native rubber problem as having any serious angle as far as they were concerned.

With the increase in native rubber production as dramatically demonstrated by the mounting exports from native areas, interest was gradually aroused and within the last

Natives Drying Rubber

two years several serious surveys have been carried out by independent interests and notably by the Rubber Manufacturers Association, New York, and the Rubber Growers' Association, London, with the result that the truth is being brought out into the open for the first time.

It has been generally assumed that native rubber brought into Singapore for refining and shipment was considered as 70 per cent dry, but some authorities are now believing that 80 per cent is a more accurate figure. According to official opinion this belief in differences in dry content is due to the serious charge that Chinese shipping companies have been cutting freight rates while the Netherlands companies have maintained schedule rates but attracting cargo by a policy of underweighing the rubber. The 1929 figures for the imports of native rubber into Singapore, taken in contrast with re-exports, would indicate such discrepancies in weighing and the local Registrar of Imports at that port believes that such imports are understated about 10 per cent but according to official announcement, "he does not believe the practice can be stopped and is taking no steps

Government Inspection of Native Rubber at Djambi

Native Boys Rolling Moisture From the Rubber Slabs

in that direction, feeling that since the export figures are accurate, any discrepancy in imports is relatively unimportant."*

A comparison between the official Dutch figures of native production for the past few years as against the estimated actual production for the same periods is shown in the following table:

Dutch Native Production
(Long Tons)

	Dutch Official Figure	*Actual Production*
1927	95,458	99,000
1928	86,614	93,000
1929	125,000**	110,000
1930	135,000**	140,000*

*Estimated. ** Potential.

Estimates of the acreage in native holdings from the best authoritative sources, by years from 1920, follow:

Acreage of Native Holdings

	Acres
1920	460,000
1921	480,000
1922	540,000
1923	615,000
1924	675,000
1925	825,000
1926	1,050,000
1927	1,400,000
1928	1,890,000
1929	2,200,000

The British Rubber Growers' Association of London have recently published the report of their two investigators, Messrs. V. A. Tayler and John Stephens, who were sent out to the Dutch East Indies last year to make a study of the native rubber production. The report presents various conclusions regarding the present state and extent of native holdings and potential yields, for the four districts of Pontianak, Banjermassin, Palembang and Djambi, which four districts are estimated to represent 70 per cent of the Dutch native rubber. This report shows the enormous growth in the native industry but even in this instance it is believed that the figures given are far too conservative. A summary of their estimates is as follows:

Loading Native Rubber at the Port of Djambi

Estimated Planted Area—Acres

	Old	*Young*	*Total*
Pontianak	53,000	159,000	212,000
Banjermassin	50,000	100,000	150,000
Palembang	53,000	265,000	318,000
Djambi	70,000	140,000	210,000
Total	226,000	664,000	890,000

They claim that the total area of mature native rubber is now not less than 347,000 acres and the average yield per acre is not less than 700 pounds of dry rubber. Estimating the above four districts at 70 per cent of the total, the 1929 output would be around 108,000 tons, but official statistics already available place the total at 113,000 tons.

The following table showing the estimated potential production from each of the four districts for 1929 to 1933, also seems conservative, even though they represent only 70 per cent of the total native output of the region.

Estimated Potential Output—Tons

	Pontianak	*Banjermassin*	*Palembang*	*Djambi*	*Total**
1929	19,500	16,500	18,500	21,500	76,000
1930	24,500	19,000	28,500	26,000	97,000
1931	32,500	24,000	43,500	32,500	132,500
1932	42,000	29,500	61,000	40,500	173,000
1933	51,000	34,500	77,000	47,500	220,000

*Estimated at 70 per cent of total Dutch native output.

At this rate of growth on the part of the native industry it is easy to believe the rumors that the European producers in the Dutch East Indies and including the Dutch themselves are growing apprehensive over the future of the plantation estates. Only recently, W. A. Foote, the American Consul at Medan, Sumatra, who returned recently to the United States on leave, stated that many of the estate owners believe that the natives will ultimately control the production of rubber, and some Dutch interests owning plantations, are shifting from rubber to oil palm and tea.

It has been ofttimes stated that a low price for crude rubber such as now exists would cause a sharp drop in native production. No theory could be more fallacious. Under the usual system prevailing in all of the Dutch native areas where the Malay or Asiatic owner does little of the actual tapping and pays his labor on a 50-50 per centage of the price secured from the traders, a wage above 60 guilder per day is fair compensation. But the small overhead of the Malay owners and the corresponding small overhead of the Chinese traders and others who buy the native rubber, is a small percentage of the overhead necessary on European owned estates, permitting a profit to the native owner at even a ridiculously low selling price.

It has been authoritatively stated that tapping would continue even if wages fell to 50 guilder (cents) per day and that production would only begin to show a serious decline when London prices fell to 6½d. per pound. At low prices tapping would probably continue even if the native owner changes his rate of compensation to his coolies to 70-30 basis. On the vast number of small holdings operated by one family, price is not a matter of important consideration because practically all the return on the crop is clear profit.

As a matter of fact a decline in the market price which causes any decrease in plantation labor in British Malaya, in turn affords the tappers on the plantations to return to their native localities and engage in tapping native holdings, and thus remain employed even at a lower wage. The colonization of Sumatra by Javanese is also increasing and is being encouraged by the Dutch colonial government. Rubber governmental experts are assisting the natives in the development of their rubber areas and rubber is becoming practically the only money crop of the native agriculturists in many sections.

In Dutch Borneo, it is officially reported that the Chinese intermediary traders, who are generally the exporters of

(*Concluded on page* 489)

*Report of U. S Trade Commissioner Bliss, July, 1929.

Surveying Accident Rates *in the* Rubber Industry

In a Survey of Seventeen Industries Rubber Manufacturing Ranks Fourth in Severity Rate of Accidents and Seventh in the Frequency Rate—Automatic Operations Reduce Risk

By **E. W. Beck**

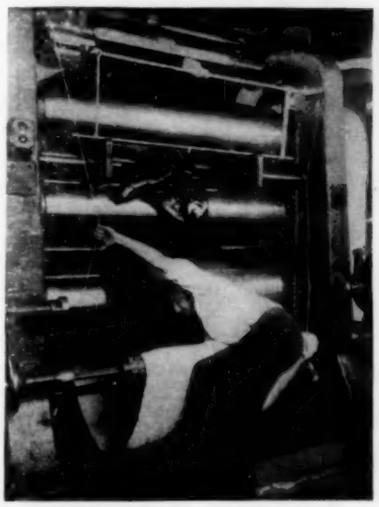
Supervisor of Safety, United States Rubber Company

THE rubber industry is not the hazardous industry that at one time it was referred to as being. Not so many years ago it was stated that a man had to pay an extra insurance premium for working in the rubber industry. Only a short time ago we had an insurance man talk at the annual meeting of the National Safety Council and he admitted that the rate for the rubber worker was higher than for many other industries. That does not hold true today.

Let us look at the reports of the severity and frequency rates of the 17 industries listed in the accompanying tables. We find an interesting analysis. You will note that the rubber industry for the year 1928 is rated as fourth; three industries show a better severity rate than rubber—they are textile, power press, and automotive. You may be surprised to find the power press and the automotive with a better severity rate than the rubber.

Let us analyze this for a few minutes and I think you will agree with me that today the power press industry is practically automatic. It should be. It was at one time very hazardous. They have "licked" their accident problem by making as many operations as possible automatic, and from the very excellent film which we saw today from the Goodyear Company, it shows that the rubber industry is going to automatic operations. Take for instance the heel punching machine. Years ago we used the old hand method; today we have the press running them out in quantities of several hundred a minute.

Now, that same thing holds true to a certain extent in the automotive industry. The conveyor has played a very important part in the reduction of accidents. The rubber industry is rated here as fourth. I think that is an excellent position for us to hold. I hope we can maintain and even improve it.



Quick Stopping Devices Showing Operation of Safety-Trip Controls as Applied to Calenders

Our severity rate increased in 1928. We have shown a 26 per cent change in our severity rate over what it was in 1927. How are we going to account for that? I believe that we should *use* our statistics. We should analyze them and try to get something out of them. Why should we have a 26 per cent increase in our severity rate? If you will look at the second table you will find our frequency rate has decreased during the last four years. In other words we have had fewer accidents with an increase in severity.

I think the problem can best be explained by the factor of speed.

*Address delivered before the Rubber Section of the National Safety Council, at the 18th Annual Safety Congress, held at Chicago, September 30-October 4, 1929.

Accident Severity Rates by Industries

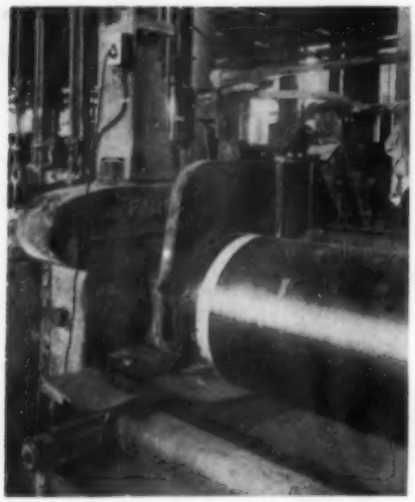
Days Lost From Accidents per 1,000 Man-Hours Worked

Industry	1925	1926	1927	1928
Textile	....	.64	.53	.66
Power Press	....	1.39	.93	1.04
Automotive	1.06	1.37	1.01	1.06
Rubber	1.11	1.17	1.00	1.26
Food	....	1.40	1.36	1.29
Packers and Tanners	1.27	1.75	1.00	1.41
Metals	2.20	2.44	1.85	1.68
Paper and Pulp	2.15	1.95	1.57	2.01
Chemical	2.71	2.28	1.90	2.08
Petroleum	2.33	2.47	2 65	2.69
Refrigeration	....	....	3.56	2.75
Public Utilities	....	4.32	3.30	3.24
Woodworking	2.75	4.51	2.22	3.79
Cement	5.02	3.97	2.99	3.96
Quarry	7.64	7.04	5.21	4.76
Construction	7.57	5.44	7.13	5.79
Mining	....	8.65	11.27	10.67

Accident Frequency Rates by Industries

Number of Lost-Time Accidents per Million Man-Hours Worked

Industry	1925	1926	1927	1928
Mining	....	82.91	87.60	67.8
Construction	69.54	57.70	65.07	59.4
Refrigeration	....	....	50.07	46.6
Woodworking	44.20	62.50	47.67	45.6
Packers and Tanners	40.15	58.88	45.42	42.3
Quarry	48.56	57.01	53.72	39.6
Rubber	29.15	30.09	38.41	28.3
Petroleum	27.35	29.23	31,15	27.3
Paper and Pulp	38 43	36.77	27.42	26.9
Public Utilities	....	33.77	30.04	26.0
Metals	32.50	35.45	26.59	23.9
Food	....	23.60	19.90	20.9
Automotive	23.42	23.60	21.51	20.9
Chemical	20.91	18 26	17.18	19.7
Power Press	....	24.23	19.45	16.8
Textile	....	13.13	12.47	11.7
Cement	26.16	22.30	14.27	7.5



Safety Testing Device for Measuring Distance of Travel of the Rolls After Safety Control Has Been Tripped

The rubber industry, as you all know, is highly competitive. The industry is studying day and night means and methods of reducing costs. There have been enormous sums of money spent to increase the units produced per man, and in doing this our severity rate has suffered.

We have had several records broken during the last few months. We have gone around the world in fewer days than the trip was ever made before. Automobile records have been smashed; motor boat records have been smashed, and it seems to be the thing to break records—but we want speed with safety.

So, in the rubber industry we are no different than any other industry; we are speeding up. Take the question of our accelerators. That is another example. Today we have these powerful accelerators that will do the job in half the time. However, we find there is a human factor to be considered. We are reducing the number of accidents, but at the same time last year we increased our days lost or the severity rate.

A large number of accidents have taken place on new equipment, conveyors, electric trucks, lifts, etc. Ten or fifteen years ago a man was referred to as an all around machinist or a first class mechanic. The tendency today is to employ operators and put them on machines. These operators today take chances the other fellows didn't take.

I feel we should very carefully analyze the causes of our accidents. Don't be satisfied with a cause that might be given to you by a person who reports the accident. He may not always know the real cause. He may, for some reason, not want the real cause to be known. For that reason I feel it is always advisable to have a second or third check for the real cause of the accident. Find out what was the real reason for the accident. Don't be satisfied to say it was carelessness, or the machine was not functioning properly, find out why the machine wasn't functioning properly and correct the condition.

Official Rubber Consumption Survey

AN official survey of the consumption of crude rubber and reclaimed rubber within the United States during 1929 and the year end stocks held by manufacturers, importers and dealers was begun on January 2 by the Rubber Division of the Department of Commerce, when questionnaires were mailed to importers and dealers. Questionnaires to manufacturers were mailed January 6 and January 10. Returns from both dealers and manufacturer dealers are at this date practically complete. No preliminary report will be issued by the department as to the statistics developed in this survey, since it appears likely that a final report can be made before February 15. A copy of the Rubber Division's report of this survey will be sent to every firm sending in a completed questionnaire.

B-L-E—A New Anti-Oxidant

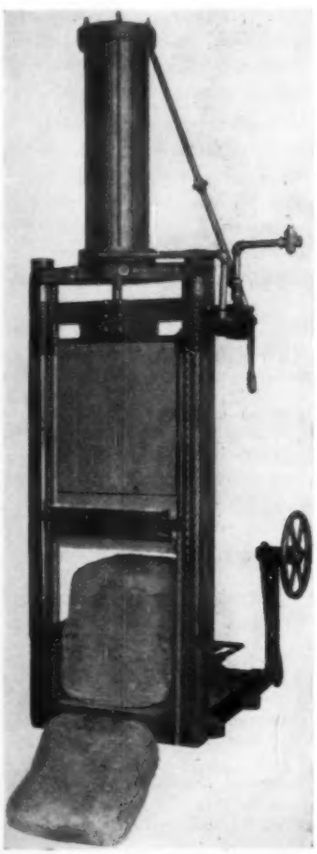
A NEW general purpose anti-oxidant of the amine reaction product type is being offered to the rubber trade by the Naugatuck Chemical Company, under the trade name B-L-E. It is in the form of a free flowing liquid which permits of quick and easy dispersion in rubber and is claimed to give satisfactory results in both compounded and gum type stocks, with the exception of pure white or stocks of delicate shades. It is insoluble in water and soluble in common organic solvents. Its specific gravity at 15 degrees C. is 1.087.

Among the advantages claimed for B-L-E by its manufacturers are its age resistance qualities and its aid in withstanding abrasion. It is also claimed to be of great value in resistance to flex-cracking. B-L-E does not stiffen or dry the uncured rubber stock but tends to soften it slightly so that tubing and calendering operations are made easier, but this softening is so slight that 3 per cent can be used in auto tube stock without handling troubles. Its solubility in rubber acts to eliminate the danger of sweating or blooming out.

Another desirable characteristic claimed for B-L-E is its near neutrality as regards acceleration of cure. It has shown no toxic effect on any of a large number of individuals who have handled it and careful tests with mice, in this connection, gave negative results.

New Crude Stock Cutting Machine

THE Black Rock Manufacturing Company, Bridgeport, Conn., have recently introduced to the rubber manufacturing industry their new 4-KB Model Crude Stock Cutter, a pneumatically operated machine for cutting bales of crude rubber into slices. An air pressure of about 100 pounds per square inch is sufficient for the best grades of stock and the manufacturers claim that diminishing pressures may be used for the poorer grades. The accompanying illustration shows a high grade bale cut into 2-inch slices, time of cut being 15 to 20 seconds. The soapstoning attachment shown at the front, is supplied for use where required in cutting certain stocks. The knife stroke is 26 inches. The net weight of the machine is 1650 pounds and is 9 feet 2 inches high. It occupies a floor space of 3 by 5 feet. The machine should be raised about 6 inches above the floor level on 6 inch I beams.



The Second Annual New York Aviation Show, is being held under the auspices of Aviators' Post No. 743, American Legion, at the Grand Central Palace, New York City, February 7-15. A great many new applications of the use of rubber in aeronautical construction are shown.

Moisture Content of Carbon Blacks

By WILLIAM B. PLUMMER*

A METHOD for the determination of total moisture in carbon blacks recently proposed (1) involves mixing the sample (5 grams) with 25 cc. of dry xylene and 200 cc. of dry mineral oil, heating to 175° C., passing dry nitrogen through the system until the xylene and water have been displaced from the carbon black-oil mixture, and continuing the nitrogen stream until all water has been displaced from the intermediate xylene receiver and absorbed in the final $CaCl_2$ tubes. By this method values of 3.54-5.96 per cent total water are obtained for channel blacks, whereas the same samples showed only 1.42-1.85 per cent loss on ordinary drying for 6 hours at 105° C.

The moisture content of carbon blacks is an important factor in many of their uses, so that the discrepancy between this and the usual oven drying method becomes a matter of practical importance as well as theoretical interest. Hence it has been further investigated.

Various types of blacks on heating in a 1-2 mm. vacuum show widely differing weight losses, as illustrated by the results in Table I.

Table I

Black	Loss in Weight at† 450° C.	750° C.	950° C.
	Per cent	*Per cent*	*Per cent*
High yield black	0.68	1.12	1.61
Channel black	2.45	5.13	7.23
Roller black	3.59	9.09	15.94

†Based on original material air dry only.

Evidently it is necessary to go to 750° C. vacuum heating to obtain a loss with channel black equal to that shown by the xylene-oil method (1) at 175° C., which is possible but would be surprising.

Certain of Johnson's (3) results bear directly on this question. Johnson heated various samples of black at 950° C. (atmospheric pressure) and analyzed the gases evolved. In parallel determinations dry nitrogen was passed through the heating chamber and the H_2O evolved was determined by absorption in $CaCl_2$ tubes. In Table II his moisture results are shown and the calculated total mols of C, H_2, and O_2 evolved in all gaseous forms are given.

Table II

Black	Free H_2O at 105° C.	Combined H_2O at 105° C.	Gas in Dry Gas Given Off at 950° C. C	H_2	O_2	Mol Ratio H_2:O_2 in Dry Gas at 950° C.
	Per cent	*Per cent*	*Mols per 100 grams original black*			
Channel A	1.35	0.30	0.132	0.051	0.078	0.65
Channel B	2.71	0.44	0.190	0.080	0.113	0.71
Roller D	2.92	0.44	0.275	0.111	0.174	0.64
Roller E	4.32	0.72	0.365	0.042	0.236	0.18

The H_2 to O_2 ratio is the most important result given in Table II. The evolved gas was found by Johnson to contain CO_2, CO, H_2, O_2, CH_4, C_2H_6, N_2, and "illuminants." A priori, it would not be impossible for such a gas to have been formed by synthetic reactions during the heating process, with H_2O and C as the only starting materials. If this were the case, however, the final H_2 to O_2 ratio, regardless of the actual components, would obviously be 2.0, which is far from being the case. This shows conclusively that the observed weight loss does not merely represent loss of moisture plus its "water gas" reaction with the carbon. It shows the original presence either of O_2 as such, or of oxygen combined with carbon and hydrogen in compounds where the molecular H_2 to O_2 ratio is very much less than 2.0.

Because of these facts the xylene-oil method (1) was studied further to determine possible causes of error. It has been found that on bubbling ordinary commercial nitrogen containing 0.3 per cent of oxygen through mineral oil at 175° C. an apparent conversion of about 60 per cent by weight of the oxygen to water is obtained. With purified "O_2-free" nitrogen bubbled through the oil only a small blank is obtained. On the other hand, if thoroughly oven-dried carbon black be added to the oil and "O_2-free" nitrogen passed through, the water evolved is equivalent to about 1 per cent, based on the black. Similarly, using black previously heated in vacuum at 1000° C., cooled in vacuum, and saturated with dry O_2 at 25° C., the water evolved equals 1.45 per cent on the black.

Experimental Work

A train was set up in which commercial tank nitrogen (0.3 per cent oxygen) was passed through two $CaCl_2$ towers and bubbled through 500 cc. of "straw oil" held at 175° C., through an oil trap (a cotton-filled U-tube held at 100° C.), through two $CaCl_2$ absorption tubes, through a protective $CaCl_2$ U-tube, and through a standard "wet-test" gas meter (0.1 cubic foot dial). A total of 42 liters (1.5 cubic feet) of nitrogen was passed through the oil at a rate of 17 liters (0.6 cubic foot) per hour. The oil flask was then by-passed and 28 liters (1.0 cubic foot) more passed through to sweep out the apparatus (Table III). Following this a blank was run in which the nitrogen from the tank was passed through three bubbler bottles containing alkaline pyrogallol solution held at 60-70° C. before passing through the $CaCl_2$ towers and the oil. Another duplicate run was then made, using the same volumes, with purified "O_2-free" nitrogen, but with 10 grams of thoroughly oven-dried channel carbon black mixed with the oil.

The foregoing determinations of H_2O absorbed are not exact, as, in order to maintain parallelism with the xylene-oil method, the $CaCl_2$ tubes were not saturated with CO_2 before the determination. The first run, therefore, was repeated, using unpurified nitrogen, but replacing one of the preliminary $CaCl_2$ towers with a soda lime tower and saturating the $CaCl_2$ absorption tubes with CO_2 before the test. Using the same quantities of nitrogen, etc., the H_2O found was about 10 per cent less than in the first run. This illustrates the magnitude of this error. Comparison of the present experiments with the xylene-oil method, however, should preferably be based on the similar condition of $CaCl_2$ tubes not saturated with CO_2.

In the final run purified nitrogen and saturated $CaCl_2$ tubes were used, and 34 grams of channel black, treated as follows, were added to the oil. The black had been heated for 2 hours at 1000° C. and 1 mm. pressure, cooled in vacuum, saturated with dry oxygen at room temperature, and introduced into the oil flask without contact with air. Periodic weighings showed an initial rate of H_2O evolution of about 0.200 gram per hour, falling regularly over a

*GENERAL ATLAS CARBON COMPANY, NEW YORK, N. Y.
Reprinted from the Analytical Edition, *Industrial and Engineering Chemistry*, January 15, 1930.

6-hour period to a constant value of 0.004 gram per hour, which corresponds with the blank obtained in the second run.

In all of these tests the oil was first dried by heating to 250° C. while passing dry nitrogen through the flask during the heating and cooling period.

Table III

Run	Black Used	Weight of Black	Nitrogen	$CaCl_2$ Saturated with CO_2	Time	Apparent H_2O	
		Grams			*Hours*	*Gram*	*% of black†*
1	None	....	0.3% O_2	No	2.5	0.1245	....
2	None	....	Purified	No	2.5	0.0115	....
3	Oven-dried	10	Purified	No	2.5	0.0784	0.67
4	None	....	0.3% O_2	Yes	2.5	0.1122	....
5	Degassed and saturated with O_2	34	Purified	Yes	6.5	0.5164	1.45

†After deduction of corresponding blank.

Discussion

The foregoing data show conclusively that oxygen in the nitrogen or adsorbed on the black may react with mineral oil under the test conditions. In the description of the xylene-oil method the duration of the test and the purity and volume of the nitrogen used are not stated. It is understood, however,[1] that the nitrogen was of high purity, that it passed over but not into the oil, and that all H_2O was evolved from the oil-black-xylene mixture in 10-30 minutes. This practically eliminates the nitrogen as a factor in the results, but the present data show the need for precautions on this point. It therefore seems probable that oxygen adsorbed on the black is the main factor. The rate of reaction observed in run 5, using 34 grams of black, might appear to be too low to account for the H_2O evolved in 10-30 minutes in the xylene-oil method using only a 5-gram sample. However, the kinetics of reactions in a liquid-solid-adsorbed gas system are so complex that it is difficult to predict the effect of the amount of solid present on the observed reaction velocity, while also this must depend largely on the particular character of the oil used. In the present case the oil was a refined paraffin wash oil ("straw" oil) and presumably more resistant to oxidation than the average petroleum fraction of like boiling range.

Based on the apparent conversion of O_2 to H_2O observed in run 1, the 0.67 per cent H_2O evolved in run 3 would correspond to 1.0 per cent oxygen adsorbed on the black, and the 1.45 per cent H_2O found in run 5 would correspond to 1.9 per cent oxygen. The work of Hulett and Cude (2) shows only about 0.14 per cent free O_2 removable as such from channel blacks at room temperature and 0.6-1.0 per cent removable as O_2 CO_2 and CO at 445° C., while their original analysis shows about 2.5 per cent total oxygen present. Johnson's results (3) show about 3.0 per cent oxygen removable in all forms (except H_2O) at 950° C. No final conclusions can be drawn from these figures as to the original amount of adsorbed O_2, but from what is known of the mechanism of adsorption of O_2 on carbon and other oxidizable surfaces, and of the mechanism of its subsequent removal (Langmuir's general studies on oxygen films), it is probable that a large proportion of the total oxygen content is originally present as adsorbed O_2, regardless of the form in which it ultimately appears on heating and evacuating.

All of the foregoing experimental observations and general facts are in agreement with the belief that the "additional moisture" shown by the xylene-oil method is mainly the product of the reaction of the mineral oil with the oxygen adsorbed on the black.

Acknowledgment

These results are published with the permission of the Combustion Utilities Corporation, at whose laboratories, at Linden, N. J., the work was carried out.

[1]Private communication from Carson.

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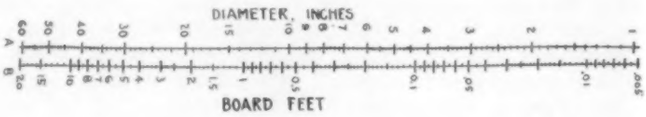
Schaphorst's CHATS *with the* ENGINEER

By W. F. SCHAPHORST, M.E.

How Many Board Feet In That Circle?

EVERY once in a while we find it necessary to know the number of board feet in a circular disc such as might be used for a tank, vat, barrel head, circular cover, or for some other purpose. Circles are commonly employed in the rubber industry.

Herewith is a chart which shows at a glance the number of board feet in any circular disc varying from 1 to 60



inches in diameter and 1 inch thick or less. For example, how many board feet in a circle 30 inches in diameter? Find the 30 in Column A and glance across to Column B where the answer is found to be nearly 5 board feet.

In other words, simply find the diameter in inches in Column A and directly opposite in Column B you will find the answer.

Why Bearings Get Hot

IT IS commonly thought that bearings heat because of insufficient lubrication. To be sure, lack of lubricant is a bad thing, and will invariably cause heat, but that is not always the cause of heating.

Clearance is very important. If the clearance in the bearing is either too large or too small the bearing will heat. When clearance is too large there is greater pressure per square inch between the metal parts that make contact or that "almost" make contact, and as a result heating will occur. The shaft that is too small is more liable to cut through the oil film because of this greater pressure. As soon as the film is cut, and we have true metal-to-metal contact, wear becomes very rapid and a "hot box" may result.

On the other hand if clearance is too small the bearing will "bind." If the fit is so close that room for lubricant does not exist it is clear that fraction will be great. Then, the greater the friction the greater the heating. With rise in temperature the shaft "swells."

Next comes alignment. If we have several rigid bearings in a row with a shaft through them, and if the bearings are not in perfect alignment, the shaft will surely press more intensely against the edges of the bearings than elsewhere. The lubricating film will very likely be broken, and heating will result. Even if the bearings are self-aligning there will be greater pressure between the shaft and bearings than where alignment is correct.

And then there is dirt. Everybody knows, or should know, that regardless of the kind of oil used, bearings must always be kept clean. The highest priced oil obtainable in the world will not and cannot offset the harm that will be done by dirt.

Native Rubber Cultivation in the Dutch East Indies

(*Continued from page* 484)

the product, still have considerable capital behind them in spite of the lengthy depression in rubber prices and are continuing to travel up and down the markets in the rubber districts, purchasing supplies for immediate shipment. It is also reported that the natives have steadily continued to plant rubber trees, especially in the districts of Hartapoera, Oeloes-Soengei and Kloea, in contrast to the lack of plantings by European and Japanese estates.

Quality of Native Rubber Improving

Through legislation and standards adopted by the Dutch authorities, the quality of the native rubber is improving. The realization of better prices in the market is contributing also to make for a better crude rubber product. It was determined by the Native Rubber Investigation Committee, of the Dutch East Indies, some years ago that an allowance of one-third for moisture and dirt should be allowed for the purpose of calculating the dry rubber content of native rubber. With the bulk of native wet rubber going to Singapore and Penang, where it is remilled and refined into crepe or smoked sheets similar to the output produced by the European estates a profitable remilling industry has been developed at those two rubber ports and it is only recently that the Dutch authorities in the Dutch East Indies have made efforts to retain this remilling business through the erection of factories for this purpose. Since the construction of these remilling plants in the Dutch East Indies, an ordinance has been passed making it necessary to secure a license before such a factory can be operated, the object being to regulate the number of factories in any one district. There is nothing compulsory on the natives to deliver their product at these factories and exports of wet rubber still remain unrestricted but growers and dealers shipping such rubber are assessed an export duty of five per cent ad valorem. Estate rubber is not subject to such a tax.

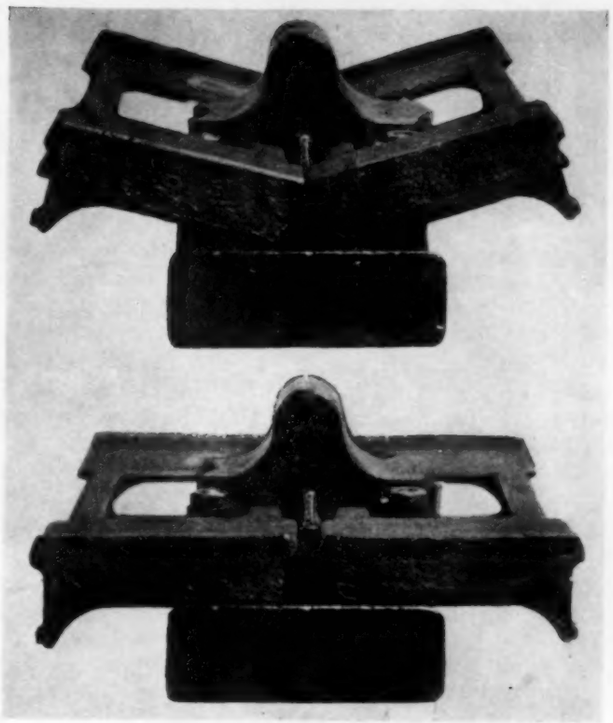
There is little likelihood of there even being any cooperation between the native growers and the estate owners in the formation of joint selling agencies or any other form of coordinate effort. The area of the native plantings is too vast in extent for serious administration of any such scheme and the number of individual holdings far too numerous.

The vast production of Dutch native rubber which is increasing in almost geometrical proportions presents a very serious problem for the plantation estate owners and it will not be surprising to see the native dominate the rubber situation within the next decade.

Rubber Jointed Track

A NEW departure in the construction of track units for caterpillar tractors and other similar vehicles has been developed by Roadless Traction, Ltd., of Gunnersbury House, Hounslow, Middlesex, England. The track units, as shown in the accompanying illustration, consist of three blocks of rubber held in position between the tooth member and the ground plate, but allowing articulation of the joint. There is no metallic contact between the various rolling path members, or between them and either the ground plate or tooth member. The rubber, being always under compression, takes up all the movement.

Among the advantages of the new unit it is claimed that wear and tear is reduced to the minimum, a high over-all efficiency is obtained, the joint being practically frictionless, and uniform and continuous contact with the ground is assured. In its construction the rubber jointed track provides for lateral flexibility, making it possible to avoid bad spots in the road, while the rubber pads absorb shock which would ordinarily be transmitted to the passenger. No lubrication, of course, is necessary and the rubber pads can be replaced at small cost in the event they are severly damaged.



Rubber Jointed Track Unit

Automotive Rubber Exports Gain

THE exports from the United States or rubber automotive goods during 1929 amounted to $43,092,441 in value, according to reports of the Department of Commerce. This represents an increase of nearly 5 per cent as compared with $41,203,869 for 1928. In the face of the reduced unit values of practically all items, this increase in exports is all the more remarkable. The aggregate volume of all automobile rubber goods shipped abroad thus establishes a record both in value and quantity.

The general value increase of 5 per cent was effected almost solely by pneumatic tires. Exports of casings for pleasure cars, trucks and busses manifested an advance in value of 7 per cent, while casings and inner tubes for motorcycles, bicycles, airplanes and other vehicles registered an increase of 25 per cent. The latter advance was probably brought about by increased trade of airplane casings and tubes which are allocated in this class.

Exports of solid rubber tires for trucks declined in value by 30 per cent, but the large increase in exports of truck and bus casings of six inches and over counteracted fully the decrease in solids. Other solid tire exports also registered a corresponding decline in both volume and value.

Exports of automobile casings during 1929 amounted to 2,979,438 units, of which 293,502 were truck and bus sizes. Although volume broke all previous records, it did not attain the height which foreign trade experts estimated at the beginning of last year, principally because exports to Europe were less than was expected. European distributors of American tires anticipated a greatly increased market during 1929 and therefore during the latter part of 1928 placed unusually heavy orders with the American companies, with the result that exports reached almost phenomenal figures during the first three months of 1929.

EDITORIAL COMMENT

When Will the "Upward Turn" Come?

WHILE there is no doubt that business in general is below "normal," this is no time to be pessimistic and there have already been several indications recently that the horizon for the rubber industry is brightening. There has been a steady rate of factory operations maintained since the first of the year with little or no dislocation of employment other than slight adjustments, made more in the interests of greater efficiency and coordination of production than for economy. P. W. Litchfield, president of Goodyear Tire & Rubber Company predicts a steady increase in employment as the year progresses and states that there has been no reduction in wage scales in the Akron rubber manufacturing section. It now seems to be the concensus of opinion that the sale of tires during 1930 will not fall appreciably below the high record of 1929 and that demands for replacements will be especially large. The new building programs and scheduled road developments reported to President Hoover by states and municipalities throughout the country must necessarily offer a particularly attractive market for mechanical rubber goods.

The "upward turn" is bound to come and may come very soon. All business has not been equally disturbed. Agriculturally America is prosperous. Excellent securities on the stock market are at levels which cannot recede farther in the light of the actual returns which these stocks are earning. As Julius H. Barnes, chairman of the President's National Business Survey Conference says, "Why should there be tacit acceptance of the former theory of cycles which involved extravagant inflation, to be followed by discouraging depression?" Why should not the voluntary teamplay of organized business disprove the theory of these cycles of peaks and valleys? Much can be done by cooperation. He points out that "it is time for collective common sense and for the most intelligent voluntary teamplay."

But his most interesting comment touches every citizen and represents an angle of the whole situation which cannot be stressed too strongly, for in its adoption lies the power of collective optimism,—that determination to make conditions better. He says:

"The avenue of most direct absorption of any margin of unemployment, large or small, in any community, lies not alone in its larger building projects, the construction of public works, or office buildings, or factories or individual homes, but it rests also in these present weeks in the more modest phases of repairs and re-equipment. The extra sunporch, new fixtures for the bathroom, new floor in the cellar, painting and varnishing, repairing and overhauling of the family auto, and doing now all these things under thrifty and prudent decisions may help to maintain the even flow of business stability while the larger programs are working out their necessary plans."

Rubber Income Tax Returns

THE recently published corporation income tax returns of the rubber manufacturing companies for 1928 would certainly bear out the statement of F. A. Seiberling, made at the last banquet of the Rubber Manufacturers Association, that "we are handling the rubber business today without rhyme or reason." Out of a total of 677 manufacturers of rubber goods or related products reporting to the government, 316 made no net income. Of course it was a bad year and much was lost in inventory adjustments after the tremendous drop in crude rubber from around 42 cents to 20 cents per pound, and no doubt the figures for 1929 will show an improvement, in spite of the Wall Street debacle in October, but there is hardly any justification for an industry maintaining itself year after year with such a percentage of profitless establishments.

Even considering the 322 manufacturers who did make money, their net income only came to $41,597,266. Taking the gross sales of the entire group of 677 manufacturers, we get a figure of $1,144,376,827 as the total business of the industry during the year. But when we deduct the total net loss of the unfortunates from the total net income of the others, as stated above, we get the ridiculous figure of $10,502,010 as the net income on over a billion dollar turnover, or a net return of less than 1 per cent.

Such a condition is astounding but the tragedy of it is that it persists year after year, not possibly at such a low figure but certainly not at a very encouraging one. It is time for the industry to heed Mr. Seiberling's counsel and coordinate efforts. Must this "profitless prosperity" continue to persist in one of the largest and most important industries in the United States?

The RUBBER AGE *Published on the 10th and 25th of each month. The Only Twice-a-Month Rubber Publication.*

THE PALMERTON PUBLISHING CO., INC.

Editorial Office, 250 West 57th St., New York City

Telephones: Columbus 2923, 2924

THE RUBBER AGE is published on the 10th and 25th of each month by The Palmerton Publishing Co., Inc., a New York corporation. P. L. Palmerton, President; Earl D. Osborn, Vice-President and Secretary; Peter P. Pinto, Treasurer. Publication Office, 1-3 Peace St., New Brunswick, N. J. Subscription rates: Domestic, $2.00 a year; Canada, $2.50; foreign, $3.00; single copies, up to 3 months old, 20c; over 3 months old, 50c. Advertising rates on application.

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Representatives in all the rubber centers of the United States, Canada, England, France, Germany and the Middle East.

The Rubber Industry's CURRENT NEWS

Financial—Personals—New Rubber Products—
Building Operations—Manufacturing—Exports

GLOBE-UNION BATTERY BUYS COOPER BATTERY

The Globe-Union Manufacturing Company, Milwaukee, Wis., last month purchased the battery plant and business of the Cooper Corporation, Cincinnati, O. The Cooper Corporation will receive an equivalent of $300,000 in cash and in stock for the plant, which has a production capacity of 1,000 batteries a day.

In addition to its Milwaukee factory, the Globe-Union Company has plants at Chicago, Philadelphia, Memphis and Seattle. The Cooper Corporation late last year entered into a contract with the Seiberling Rubber Company to manufacture automobile storage batteries for the latter under the Seiberling name.

AMERICAN HARD RUBBER INCREASES ITS OUTPUT

Increased production and a schedule that will justify a return to almost normal employment basis early this month was announced on January 13 by W. E. Johnson, superintendent of the Akron branch of the American Hard Rubber Company. "February releases from car manufacturers," he said, "are responsible for the increased business. Work on the new specifications will begin about the first of February and will permit an increased force."

The American Hard Rubber Company is reported to have experienced an excellent trade demand during the winter months, and the production level maintained has served to keep its factory forces at all plants well occupied.

"MERCURY" TO BE BRAND OF UNITED TIRE STORES

George J. Burger, president of the United Tire Stores Corporation of America, has announced that the brand name for the tires and tubes to be manufactured for distribution by its members will be "Mercury." The name, suggested by F. A. Fenton of Akron, O., was adopted as the result of a contest held to find an appropriate name.

The United Tire Stores Corporation was formed last year by members of the National Tire Dealers' Association and the former Automobile Tire Dealers League of America with the purpose of combining the purchasing power of a number of leading dealers for greater economy.

Murray Concentrates on Tires

The mechanical goods department of the Murray Rubber Company, Trenton, N. J., has been closed indefinitely and will probably be closed permanently to allow the company to concentrate on tire and tube manufacture. The development of the Murray chain stores, which now total 1,200, is given as the reason for the proposed step.

A. C. S. Atlanta Headquarters

At the 79th meeting of the American Chemical Society at Atlanta, Ga., from April 7 to 11, the headquarters of the society will be at the Atlanta Biltmore Hotel. The Rubber Division, which will hold two half-day sessions, will also have its headquarters there.

Du Pont Earns $72,300,626

E. I. du Pont de Nemours & Company report total net earnings for 1929 of $72,300,626, or $7.09 a share on 10,196,777 average number of shares, as compared with $58,733,238 for 1928, or $6.27 a share. While the major portion of du Pont earnings came from the company's investment in the General Motors Corporation, the income from operations last year was $34,212,150, as compared with $22,464,102 in 1928.

INCOME TAX REPORTS TO BE HIGHER FOR 1929

While it is impossible to approximate any figure for the net income of rubber manufacturing companies for the calendar year 1929 as yet, it is expected that company reports now being filed with the government will show a much higher total than was indicated during 1928. Whereas 316 companies reported deficits in 1928, the comparative stability of the crude rubber market last year should cut this number down considerably.

In 1928, a total of 638 companies reported gross income of $1,144,376,827 and net income of only $10,502,010, or less than 1 per cent. Of the total reporting, 322 firms showed a gross of $909,707,273 and a net profit of $41,597,266. The other 316 concerns reported a gross of $234,668,554 and a deficit of $31,095,010. The companies which showed a profit paid a total income tax of $4,806,977.

DEXTER RUBBER COMPANY HAS TRIPLED PRODUCTION

The Dexter Rubber Manufacturing Company, Goshen, N. J., has increased its plant facilities from a capacity of 1,500,000 pounds of rubber products to 8,000,000 pounds. New in the automotive accessory department is the Stick-Rite flap for Model A Ford rims. This is a duck flap coated on one side with a tacky self-vulcanizing face to be used in replacing the cork and paper protection that accompanies original equipment. When applied, it fits the well of the rim, permanently vulcanizing itself without possibility of slipping or buckling and prevents contact of rusty rim and tube.

A new department has been added for the manufacture of a complete line of friction and rubber tapes to be made in two grades of each, standard and high test. An outstanding development of this department is Twin Tape, a new patented process which includes a combination of rubber and friction tape in a single unit. This tape, which offers consumers the feature of one wrap instead of two, is to be offered to the trade through electrical jobbers.

Carlyle W. Myers, formerly general manager of the Virginia Carolina Rubber Company, Inc., has been elected vice-president of the Dexter Rubber Manufacturing Company and will be in direct charge of advertising and sales. Mr. Myers is closely identified with the rubber and wholesale automotive industry, having introduced to these markets the Va-Car automatic principle of tire repair.

HANKINS RUBBER COMPANY DOUBLED TRADE IN 1929

More than doubling its business in 1929, the Hankins Rubber Company, Massilon, O., looks to 1930 as the biggest year since its organization. This forecast is based on the record number of inquiries received by the company the past few weeks, and, with the plant already operating at 100 per cent capacity, officials of the company plan to enlarge production facilities as rapidly as possible.

The Hankins Company has an improved process for manufacturing rubber gloves of high quality. At a stockholders' meeting last month, directors were elected for the current year, including S. Bert Hankins, Charles G. King, Mrs. Mary Yohe, William J. Ries and Harry Conrad. Mr. Hankins and Mr. Ries were elected president and vice-president, respectively, and Laura E. Hankins was named secretary-treasurer.

CHICAGO RUBBER GROUP DISCUSSES INSTRUMENTS

Members of the Chicago Rubber Group of the American Chemical Society held their first 1930 meeting on January 17 at Maillard's Restaurant, Chicago, Ill. About 100 chemists and technologists were present, including several from New York and Akron, and listened to three papers on instruments for the rubber factory.

L. J. D. Healy, technical superintendent of the Fisk Rubber Company at Cudahy, Wis., read a paper on the subject of "Modern Developments in Control Instruments for Rubber Factories," which was followed by a discussion of "Recently Developed Instruments for Tire Vulcanizing Processes" by R. E. Olson, of the Taylor Instrument Companies, Rochester, N. Y. E. L. Stilson, of the Bristol Company, Waterbury, Conn., spoke on "Modern Developments in Instruments for the Rubber Industry," and a general discussion followed, with many members bringing up questions as to calibration and installation of instruments.

Dr. C. E. Frick, chairman of the group, announced that the next meeting will be held at the same place on March 21 and that the subject will be one closely allied with milling and mixing. Reservations for the next meeting or further information may be obtained from B. W. Lewis, secretary of the group, at Wishnick-Tumpeer, Inc., 365 East Illinois Street, Chicago, Ill.

UNIVERSITY OF MICHIGAN HAS CHEMICAL COURSES

The Department of Chemical Engineering of the University of Michigan, Ann Arbor, Mich., has just issued its announcement of courses for 1930, including graduate programs in general chemical engineering, metallurgical engineering, gas engineering, and organic chemical industries. The technology of rubber is treated directly in certain courses, such as No. 5 on Chemical Technology of the Organic Industries, and opportunity is offered in advanced courses for further specialization.

"The demand for men with technical training has increased greatly in the last ten years," says Alfred H. White, professor of chemical engineering, "so that at present the demand far outruns the supply. Employers are not only writing, but also sending representatives to the university to interview graduates. A statistical study during 1929 shows that there were calls for 363 men, which was more than seven times the number who were going out as graduates from this department."

Copies of the new bulletin of courses may be secured by writing the Chemical Engineering Department, University of Michigan, Ann Arbor, Mich.

India Wins Patent Case

The India Tire & Rubber Company was awarded sole patent rights for the use of a specified type of cord breaker strip in the manufacture of truck and bus tires in a decision by Judge John Paul Jones in the federal court at Cleveland on January 18.

Herbert DuPuy

Herbert DuPuy, chairman of the board of directors of the Pennsylvania Rubber Company, Jeannette, Pa., died on January 10 at his home in Pittsburgh. Mr. DuPuy was nationally known as a manufacturer, financier and philanthropist, and his activities covered a wide range of industries.

Born May 10, 1856, in Chicago during the time his father was general manager of the Illinois Central Railroad, he moved with his family to Philadelphia in 1864. After being graduated from Lehigh University in 1878 as a metallurgical chemist, he was associated with the late Andrew Carnegie in the iron and steel business at Pittsburgh. In 1881, Mr. DuPuy was instrumental in the building of a crucible steel plant at McKees Rocks, Pa., later absorbed by the Crucible Steel Company of America, of which company he served as chairman of the board of directors.

In 1898, he pioneered in the development of coal fields in the Klondike region, securing 7,000 acres of coking coal land. Later, as head of the Morewood Realty Holding Company, he became one of the largest holders of real estate in New York City. He was also a director of the Pittsburgh & Lake Erie Railroad, the Farmers Deposit National Bank, the Monongahela Bridge Company and other companies.

It was in 1904 that he bought a controlling interest in what is now the Pennsylvania Rubber Company, moving the plant from Erie to Jeannette, where it has since been located. Mr. DuPuy married Amy S. Hostetter on November 6, 1879, and celebrated his 50th wedding anniversary with Mrs. DuPuy two months before his death. He was preceded in death by two sons, each of whom had been president of the Pennsylvania Rubber Company.

Pioneer Directors Re-elected

The annual stockholders' meeting of the Pioneer Rubber Company, Willard, O., was held on January 21. The following directors were reelected: T. W. Beelman, R. K. Williams, W. R. Richards, K. L. Milligan and J. C. Gibson.

To Redeem Goodyear Bonds

The Central Hanover Bank & Trust Company, New York City, as trustee, has announced that $56,500 par value of Goodyear Fabric Corporation 10-year first 6 per cent bonds has been designated by lot for redemption April 1 through the sinking fund provided for that purpose.

U. S. Rubber to Redeem Notes

The Guaranty Trust Company, as paying agent, has announced that the United States Rubber Company has deposited an amount sufficient to pay the principal and interest of its 6½ per cent serial gold notes, series E, due March 1, 1930. Owners of these notes who desire to receive payment prior to March 1 may, upon surrender thereof with coupon due March 1, at the trust department of the Guaranty Trust Company, 140 Broadway, New York City, receive in payment the principal amount thereof and accrued interest to the date of surrender.

BID FOR WILDMAN PLANT IS REJECTED BY COURT

The district court of the United States for the northern district of Ohio early last month refused to confirm the sale of the Wildman Tire & Rubber Company, Port Clinton, O. The plant was again placed on sale on January 16, but the receiver was still unable to secure a suitable bid and the sale is, therefore, to be continued each Thursday until disposed of.

The old rubber plant was sold at public auction on August 15, 1929, through the Industrial Plants Corporation to the Port Clinton Fish Company for $11,000, this bid being rejected by the court as too low. At the same time the machinery and equipment were disposed of in small lots to a number of bidders and brought $25,000, this sale being later confirmed by the court. The plant, which has not been in operation for seven years, was at one time the factory of the Clinton Tire & Rubber Company, which sold the property and equipment to the stockholders of the Ohio State Tire & Rubber Company for a price of about $150,000. Later the plant was taken over by the Wildman Company, but was operated by them only a short time.

The only bid received on January 16 was for $20,000 and included the entire property of 17 acres and about 60,000 square feet of floor space in the manufacturing buildings. Russell B. Koontz of Akron is the receiver.

RUBBER COMPANY STOCKS GAIN DURING FORTNIGHT

With the exception of Firestone and Miller issues, the securities of rubber manufacturing companies on the various exchanges closed the fortnight higher, Goodyear leading the way with a gain of nearly 10 points. With the expiration of the three-year terms of President P. W. Litchfield and the 17 members of the Goodyear board of directors less than two months away, the usual rumors have been heard about a merger to take in United States Rubber and Seiberling. The latest story, which has been denied, is that Mr. Litchfield will retire to become head of an insurance company.

Prices of rubber company shares on February 4 compare as follows:

	Last Price		High	Low
	Feb. 4	Jan. 21	—1930—	
Ajax	2	2	2½	1⅝
Falls	4⅜	—	4¾	3
Faultless	—	—	—	—
Firestone	29¼	31	33⅛	28¾
do 6% pfd.	82⅛	83⅜	86⅜	80½
Fisk	3⅞	3¼	4⅛	3
do. 1st pfd.	18⅝	15½	20	13
General	—	—	160	150
do. pfd.	—	—	91	88½
Goodrich	48¼	43¼	49¼	40¼
do. pfd.	—	—	95⅝	95⅝
Goodyear Com.	74	64½	76⅜	62
do. pr. pfd.	—	93⅝	95⅝	90
India	15	—	18	8½
Intercontinental	5¼	5	5⅜	4¼
Kelly Springfield	4¾	4⅜	5¾	3¼
do. 6% pfd.	—	39	39	29
Lee	8	—	9	6¼
Miller	4¼	4½	4¾	3⅞
do. pfd.	27	31	32	18
Mohawk	—	8½	14	8½
do. pfd.	50	—	55	50
Norwalk	—	—	1	⅞
Pirelli	49⅛	—	50⅛	45
Raybestos-Manhattan	41⅞	39¼	43⅛	33
Seiberling	15½	14	16	10¼
do. pfd.	65	—	74	64⅞
U. S. Rubber	26⅞	28	27½	21⅛
do. pfd.	51	49½	52⅞	47⅜

LITCHFIELD ELECTED TO ARBITRATION ASSN. BOARD

Lucius R. Eastman, president of the American Arbitration, announces the election of P. W. Litchfield, president of the Goodyear Tire & Rubber Company, to the board of directors of the association. President Hoover, Newton D. Baker and Charles Evans Hughes are honorary presidents of the association and its officers and directorate comprise many of the business and professional leaders of the country.

Mr. Eastman, in commenting on the participation of Mr. Litchfield said: "The rubber industry has been one of the leaders in the extension of commercial arbitration and it is our good fortune to have so prominent a representative as Mr. Litchfield closely identified with our work. The new director's international experience through the widespread Goodyear interests in England and the Dominions will bring added vision to the arbitration program. The tire industry in this country alone is of tremendous importance and it will be ably represented in this work of business stabilization by Mr. Litchfield."

RE-ELECT OFFICERS OF MASSILLON RUBBER CO.

That the year just closed was one of the best in its history and that the outlook for 1930 business is bright, were reports presented to the stockholders of the Masillon Rubber Company, Massillon, O., manufacturer of druggists' sundries and surgical rubber goods, at their annual meeting on January 8. Directors and officers were re-elected.

Members re-elected to the board of directors were J. G. Lester, Robert H. Hess, Albert Geis, George L. Geis, B. W. Groff, H. V. Ress, C. E. Schworm, J. F. Tschan and A. Frank Boerner. Officers named were Mr. Lester, president and general manager; H. P. Croxton, secretary-treasurer; Mr. Boerner, superintendent; and Miss Helen Bonnevier, assistant secretary.

RUBBER COMPOUND USED TO LINE X-RAY ROOMS

A new rubberized compound which will resist the penetration of X-rays and may, therefore, be used in lining rooms where X-ray apparatus is used has been developed by engineers of the Goodyear Tire & Rubber Company. Produced in sheets similar to rubber flooring, about one-half inch thick, the new compound has an X-ray repellance factor equal to that of lead sheeting one-eighth inch thick.

The only suitable substance for lining of X-ray rooms heretofore has been lead, which requires nails to hold it in place. Because of the nails used in mounting the heavy metal, this wall covering can not be absolutely ray proof. The new rubber, which will be known as Ray Rubber, can be mounted by use of cement. The New York University Hospital, New York City, and St. Mary's Hospital, Huntington, W. Va., will be among the first to use the new rubber.

Desert Camels Also Travel on Rubber

EVEN camels in the Gobi desert wastes of Asia sometimes "ride on rubber." A cameleer is shown here sewing a section of the tread of a tire over a wound in a camel's foot, the process being no more painful to the animal than the shoeing of a horse, and the cut is thus protected. The above photograph is reproduced from the *Natural History Magazine* through the courtesy of the Federal Rubber Co.

DUNLOP-PERDRIAU SAID TO HAVE BOUGHT RAPSON

Negotiations have been proceeding for some time past between the Dunlop-Perdriau Rubber Company of Australia and the Rapson Tire & Rubber Company of Tasmania, and it has now been officially announced by the directors of the first-named company that an agreement has been arrived at by which the business of the Rapson Company is to be acquired. This agreement will be submitted shortly to stockholders of the Rapson Company for approval.

The Rapson concern is an Australian offshoot of the English undertaking of the same name. The Australian company has not paid a dividend on its capital since it was established, whereas the Dunlop-Perdriau organization has attained a very strong financial position. The course of the market for the preference shares of the Rapson Company has lately been followed with great interest on the Sydney Exchange, because when the board of directors entered into negotiations with Dunlop-Perdriau it issued a warning that it would be in the interests of stockholders not to sell their holdings for the time being. Part of the arrears of dividends on the preference shares is guaranteed by the Tasmanian Government.

Dunlop-Perdriau is an amalgamation of the two rubber firms of those names. Before that amalgamation was completed, Australian Dunlop acquired control of the Barnet Glass Rubber Company by purchasing the majority of the ordinary shares. The latest transaction will mean that the four most important rubber manufacturing companies in Australia will be brought under the same management.

Foreign Trade Convention

The 17th National Foreign Trade Convention will be held at the Hotel Biltmore, Los Angeles, Cal., from May 21 to 23. The fact that Los Angeles has become in recent years a prominent exporter of rubber manufactures is expected to make this year's convention of especial interest to the rubber industry. Registration should be made to O. K. Davis, secretary, National Foreign Trade Council, India House, 1 Hanover Square, New York City.

Self-Lubricating Bearing

A new self-lubricating bronze bearing, said to be the only one of its kind, has just been announced by the Johnson Bronze Company, New Castle, Pa. According to P. J. Flaherty, president and general manager of the company, the new bearing provides for a uniform area of bearing surface on the pressure line, and insures an efficient distribution of lubricating compound. The improved results are obtained by a new method of effecting identations in the metal and by placing them on an angle of 30 degrees.

CATALPO
for
Mechanicals

Names in the News

HARRY A. CURTIS of Yale University was the principal speaker before the meeting of the Akron Section of the American Chemical Society on February 6.

E. DOYLE SUFFOLK of the Goodyear Tire & Rubber Company has been elected president of the Portage Lakes Red Cross Life Saving Corps. He had served as vice-president of the corps three years.

ADOLPH E. NORDEN, of the firm of A. Norden & Company, New York City, has been admitted to membership in the Rubber Exchange of New York. Mr. Norden replaces GEORGE E. HUTZLER in the co-partnership of that firm.

GEORGE MILLER, engineer in charge of the Firestone Tire & Rubber Company, described his experiences in helping to establish a location in Liberia for a rubber plantation headquarters at a meeting of the Knights of Columbus Service Club of Canton, O., on January 16. Along with personal incidents, he discussed the general appearance of Liberia, its future possibilities in the development of rubber, and the customs of the natives.

LUCIEN KING, for fourteen years advertising manager of the Goodyear Tire & Rubber Company, and recently with the Outdoor Advertising Agency of America, Inc., has joined Erwin, Wasey & Company, Inc. He will serve as account executive.

JOHN W. THOMAS, vice-president and general manager of the Firestone Tire & Rubber Company, was a speaker on January 22 before the annual meeting of the South Akron Board of Trade.

V. R. JACOBS, of the government and aeronautical sales departments of the Goodyear Tire & Rubber Company, spoke before the fourth employes' meeting of the company on January 25 in Goodyear Theatre in Akron. His subject was "Goodyear and Aeronautics."

F. A. SEIBERLING, president of the Seiberling Rubber Company, returned to his winter estate at Miami Beach, Fla., on January 29.

GEORGE H. DUCK, advertising manager of the Lee Rubber & Tire Corporation, spoke before a meeting of tire dealers of Oregon and southern Washington on January 13 at Portland, Ore. Other speakers were E. L. VAN BUREN, western sales manager, and D. L. MACPHEE, Portland branch manager.

GEORGE E. MILEY, connected with the Goodyear Tire & Rubber Company for 27 years and secretary to PRESIDENT P. W. LITCHFIELD when the latter was factory manager 10 years ago, has left the company to become secretary of Sweeny Brothers, Inc., Akron undertakers. He was the first secretary of the Service Pin Association and was one of the trustees of the Goodyear Relief Association.

E. A. OBERLIN, JR., has been named president of the Firestone Park Trust and Savings Company, succeeding HARVEY S. FIRESTONE, president of the Firestone Tire & Rubber company, who has been chosen chairman of the bank's board of directors. Mr. Oberlin, who started his career as a bank messenger in Cleveland, is 36 years old.

PAGE NOLL has been appointed by the United States Rubber Company as central region tire sales manager, with headquarters

PAGE NOLL

at Detroit, Mich. He has been connected with the company for the past 13 years and, prior to coming to Detroit, was in charge of tire sales in Los Angeles, Cal.

JOHN SHERWIN, SR., director of the Goodyear Tire & Rubber Company, was elected a director of the Midland Bank of Cleveland on January 17. The chairman of the bank directorate is his son, JOHN SHERWIN, JR.

VICTOR E. BREDIGER, manager of the Johnson Rubber Company, Middlefield, O., and CLAUDE SCHREINER, chemist, have resigned from that company and are reported to be planning to form a new rubber manufacturing company at Chardon, O.

JEROME C. HUNSAKER, vice-president of the Goodyear-Zeppelin Corporation, sent a letter to REPRESENTATIVE WILL R. WOOD, chairman of the House appropriations committee, on January 24 to protest against a bill which would require the Navy to get all of its helium from the government plant of the Bureau of Mines. REPRESENTATIVE FRANCIS SEIBERLING of Akron, a director of the Goodyear Tire & Rubber Company, also is objecting to this provision at Washington.

C. J. WELCH, manager of car distributor sales of the United States Rubber Company, has resigned to become president of the Mercantile Tire Company, New York City, in which he has taken an interest. The latter is an established tire distributing concern specializing on commercial and national accounts. Mr. Welch was at one time manager of the solid truck tire department of the United States Rubber Company and later assistant general sales manager.

L. L. MCCLINTOCK has been appointed by the United States Rubber Company as district manager of tire sales of the New York district, comprising the metropolitan area and adjacent territory. He had previously been connected with the Firestone Tire & Rubber Company for the last 18 years.

STEPHEN L. CHUBBUCK has been appointed to the position of advertising manager of the Falls Rubber Company, Cuyahoga, Falls, O., to succeed JERRY N. DUNLEVY, who resigned earlier in the month.

SAM BROERS, vice-president of the Firestone Export Company, returned to Akron last month after a two-month European trip in which he visited 11 countries, inspected the Firestone tire plant at Brentford, England, and studied economic conditions on the continent. Mr. Broers found Czechoslovakia second only to France in stability of economic structure and was impressed with the fact that general conditions abroad are sounder than at any time since the war.

GEORGE S. MAHANNA, vice-president of the Corn Products Refining Company, and ROBERT I. BARR, vice-president of the Chase National Bank, have been elected directors of the Lee Rubber & Tire Corporation to fill vacancies caused by the resignation of WILLIAM B. DUNLOP and through the death of SAMUEL H. MILLER.

CHARLES H. SABIN, chairman of the board of the Guaranty Trust Company of New York, and DAVID DWIGHT DOUGLAS, president of the First National Bank in Detroit, have been elected to the board of directors of the United States Rubber Company. Mr. Sabin was also elected a member of the finance committee.

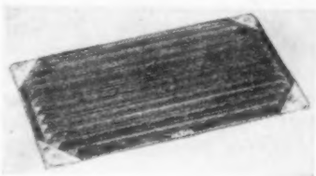
DR. LUDWIG PRANDTL, professor of aerodynamics and aeronautical engineering and design at the University of Gottingen, Germany, was a visitor to Akron on January 24 and 25 as the guest of DR. KARL ARNSTEIN, vice-president of the Goodyear-Zeppelin Corporation. During his stay in this country, Dr. Prandtl has lectured at several universities and has conferred with some of the leading airplane manufacturers.

DR. H. N. WHITFORD, manager of the crude rubber section of the Rubber Manufacturers Association, sailed on February 6 for the Far East. He will continue his studies of native rubber production both in British Malaya and the Dutch East Indies.

Rubber Goods and Specialties

Running Board Mat

Recently introduced, the Desmo step-mat is notable both for its neat appearance and for its low price. It is a ribbed rubber mat with nickel-plated metal corner pieces to facilitate easy fitting. In England it is being sold for 3s 6d, or approximately 85 cents, the manufacturer being Desmo, Ltd., Stafford Street, Birmingham. This company is also making a rubber heel-rest for fitting under the brake and clutch pedals, the ribs of the mat forming an effective heel-rest and preventing the feet from slipping.



Perfection Tire Chain

The General Tire & Rubber Company, Akron, O., until recently manufacturers only of tires, tubes and tire repair materials, have added to their products two lines of tire chains. The Perfection tire chain is constructed with wide, flat cross bars of interwoven steel covered by rubber. The cross bars, which are of tough General tire tread rubber, are widest where wear is greatest. The use of more bars per chain also means slower wear, according to the manufacturer. The larger area of road contact means less wear on the tire itself, and the smooth rubber base of the cross bar can not dig into the tire. The company is also making the well known Skid Grips of steel-studded molded rubber.

Uskide Non-Marking Sole

Adding a natural color to composition soling has never been a problem, but adding it without subtracting wearing units has been. The United States Rubber Company, 1790 Broadway, New York City, claims to have solved the problem in its new natural-colored, non-marking Uskide sole. The new Uskide, according to the manufacturer, is still the same easy-to-work bottoming material with leather-like firmness as in the past. In addition to the natural color, the new non-marking feature is expected to widen the market for this soling to include children's and dress welt footwear.

Panther Nu-Tone Sole

Under the name of the Nu-Tone sole, the Panther Rubber Company, Stoughton, Mass., is offering a sport sole for men's and boys' shoes with heels to match, in the following colors: Black, tan, red, blond (leather shade), natural pure gum, blue and green. It is of exceptionally good quality, according to the manufacturer, and its introduction is already meeting with an enthusiastic response from the trade. A companion to the Nu-Tone sole is also being offered for women's and misses' sizes under the name of the Waverly.

Colored Rubber Gloves

Brightly colored rubber gloves are one of the latest novelties for kitchen use introduced in Great Britain. Made of extra fine quality rubber, these new gloves are making a distinct appeal to the many women who hitherto have not been in the habit of protecting their hands in any way. At present the most popular colors are a rich shade of blue and a darkish leaf green, both being lined with a soft shade of yellow.

A rubber coin holder to serve the purpose of a purse has been devised by Donald Fairbairn of Detroit, Mich. Small round holes cut in a circular piece of inner tube stock rubber form the basis of the device, the holes holding the coins in place by compression.

Over-All Goggles

A high grade rubber mask type goggle that is made to fit snugly and comfortably to the face and can be worn over regular spectacles, this Over-all Style X31 is now being offered for use by welders, chippers and cutters by Willson Products, Inc., Reading, Pa. It will keep out flying liquids and dangerous chemicals, as well as dust and particles. The three indirect ventilators with which it is provided serve to keep out all stray sparks and light, while at the same time admitting generous quantities of air. The lenses are of hardened Willson "super-tough" glass, which affords ample protection for extra-hazardous work.

Martin 11-Ply Tire

The Custom Built Tire Corporation of America, 161 West 64th Street, New York City, has added to its line a new Martin Custom Built 11-ply low pressure cord tire, designed especially for the high grade automobile. It is provided with a non-skid tread and is so constructed as to assure comfortable riding at 40 pounds of air pressure. The shoulder - built sidewall prevents tramping and shimmying. No shoddy or reclaimed rubber is used, and only long staple combed Egyptian cord fabric is employed. There are three squeege cushions of rubber and an extra cushion between each of the plies.

The manufacturer offers an unconditional mileage guarantee against blowouts, stone-bruises, rim cuts, etc.

Rubber Overshoe Heels

The sunken heel of a rubber overshoe patented by the Liverpool Rubber Company, Ltd., is formed with an extension of its tread surface. This extension consists of a tongue or strip at the inside of the shoe extending below the arch and serving as a support when walking.

Current Crude Rubber Items

RUBBER EXCHANGE VOTES ON REVISING CONTRACTS

A special meeting of the members of the Rubber Exchange of New York has been called for February 10 at 3.30 P. M., to vote on a number of important changes in the by-laws of the Exchange.

The most important revision to come up for discussion is the repeal of the "BB" contract, covering the lower grades of rubber. This contract has been inactive since its adoption, practically all of the Exchange's volume being on the "A" contract.

A new contract, to be known as "No. 1 Standard" contract, will replace the "BB" contract. The new contract calls for the delivery of ten tons (about 22,400 pounds) of No. 1 standard quality ribbed smoked sheets Hevea plantation rubber conforming to the official type adopted by the Board of Governors. New rates of one-way sliding scale commissions, floor brokerage, and charges to apply on the new contract will also be voted on.

Members will also vote on the creation of a Committee on Spot Quotations and a Committee on Grading and Warehousing.

Estate Is Liquidated

The Selbourne Rubber Estates, Ltd., has been put into compulsory liquidation by a petition lodged by the Roebourne Finance & Investment Company. The Roebourne company has a financial interest in the Selbourne Rubber Estates, Ltd., in addition to having advanced money on loan, and asserts that its action was taken to protect its own interests.

Malaya General Output Gains

The Malaya General Company in the year ended August 31, 1929, showed an output of 2,126,551 pounds of dry rubber as compared with 1,401,100 pounds in the previous year. For the current year the crop is estimated at 2,280,000 pounds, and the company has arranged to market a certain proportion in the form of revertex. The company's profits were practically unchanged at £34,659 as against £34,556 in the year previous.

T. A. Desmond & Company Move

T. A. Desmond & Company, Inc., crude rubber brokers, announce that they are now located at 33 Rector street, New York City. The former address of the firm was 29 Broadway.

Seeks Exchange Membership

The Rubber Exchange of New York on January 27 received an application for membership from M. Georges Julien Schwob, of Paris, France, prominent in French rubber and produce circles. M. Schwob is connected with the Societe Francaise pour le Commerce avec les Colonies and l'Etranger, of 59 Rue Saint Lazare, Paris.

Name Clearing House Directors

The Rubber Exchange Clearing House, Inc., on January 17 announced the election of directors for the ensuing year. Those named are Harry A. Astlett, Harold L. Bache, Joseph Louis, Homer W. Orvis, William A. Overton, Fred B. Peterson, Clinton T. Revere, Marcus Rothschild and Edward C. Schwab.

D. E. I. GOVERNMENT GIVES POLICY ON RESTRICTION

The Dutch East Indies government is "agreeable in principle" to restriction of crude rubber product, but will not identify itself with such a movement, according to a cablegram from Batavia, Java, to the Rubber Exchange of New York. The cable follows:

"The Dutch East Indies government has issued a statement declaring that it is agreeable in principle to the eventual restriction of rubber output for the purpose of reaching better prices, provided that the restriction measure is based on voluntary co-operation and is of a purely private character.

"The government will take no active part in the matter, however, because it primarily affects producers themselves, and government participation or action would give it an undesirable political character."

ESTATE CHAIRMAN URGES SCIENTIFIC PRODUCTION

That rubber plantation companies should by practicing every economy and by taking advantage of all new knowledge on the subject increase output and reduce costs, so that they may afford to encourage manufacturers by selling at the lowest possible figure and still make a reasonable profit, was asserted by A. J. Stevens at the recent meeting of the Malay Rubber Planters, Ltd. "Let us forget those golden dreams of two-shilling rubber—of small outputs and high prices—false economies," he said, "and let us concentrate on scientific production and hope for steady prices showing a reasonable profit."

Mr. Stevens also discussed the future course of native rubber production, saying that the restriction period provided a golden inducement to the planting up of thousands of acres by natives and the Dutch. This rubber, he stated, was beginning to come into bearing, and the question now is at what price the native will find it profitable to tap and what, accordingly, estate producers would do.

LARGE ESTATE ADOPTS VOLUNTARY RESTRICTION

A London cable to the Rubber Exchange here reported that voluntary restriction of production has been adopted by one large plantation interest in the Far East. The Telogoredjo United Planters, Ltd., has circularized its shareholders that it has come to the conclusion that it will curtail rubber production during 1930 by 10 per cent. The letter adds:

"The matter has been discussed by both English and French units similarly concerned, and the directors have reason to think that other companies, in their own interests, will adopt a like policy."

This is the first important rubber producing interest in the Far East to voluntarily place itself under restrictive measures. The output of Telogoredjo this year is estimated to be well above 2,000 tons of rubber.

Closing Prices on Rubber Exchange of New York, Inc.

FROM JANUARY 22 TO FEBRUARY 4, 1930

		Spot	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Sales*
Jan.	22	14.80	14.90	15.00	15.10	15.30	15.50	15.80	16.00	16.20	16.40	16.60	16.80	——	253
	23	15.00	15.10	15.20	15.40	15.70	15.80	16.00	16.20	16.50	16.60	16.80	17.00	——	380
	24	15.00	15.20	15.40	15.50	15.70	15.90	16.20	16.40	16.60	16.70	16.80	17.00	——	506
	25	15.10	15.10	15.30	15.50	15.70	15.90	16.10	16.30	16.50	16.60	16.70	16.90	——	128
	27	15.20	15.20	15.50	15.70	15.90	16.10	16.30	16.50	16.70	16.80	17.00	17.20	——	681
	28	15.10	14.90	15.30	15.50	15.70	15.90	16.10	16.30	16.50	16.70	16.90	17.00	——	116
	29	15.20	15.10	15.50	15.60	15.80	16.00	16.30	16.40	16.60	16.80	17.00	17.20	——	103
	30	15.10	15.10	15.40	15.60	15.80	16.00	16.20	16.40	16.60	16.80	17.00	17.20	——	120
	31	15.10	15.00	15.40	15.50	15.70	15.90	16.10	16.30	16.50	16.70	16.80	17.00	——	186
Feb.	1	15.10	14.90	15.30	15.40	15.60	15.80	16.10	16.30	16.50	16.70	16.80	17.00	17.20	101
	3	15.00	14.80	15.10	15.30	15.50	15.60	15.90	16.10	16.30	16.40	16.50	16.70	16.90	124
	4	15.00	14.70	15.00	15.20	15.40	15.60	15.80	16.00	16.30	16.40	16.60	16.80	17.00	142

*In lots of 2½ tons each

CATALPO

for

Treads

GOODYEAR LABOR POLICY IS STATED BY SLUSSER

The unfounded rumor that Akron rubber companies have been advertising for people from other cities to come to Akron for employment, thus deliberately maintaining an excess of labor in that city, has been definitely denied in the case of the Goodyear Tire & Rubber Company by C. C. Slusser, vice-president and factory manager. In an issue of the *Wingfoot Clan*, the company's internal house organ, last month, Mr. Slusser made the following statement:

"Goodyear has not inserted a single advertisement for labor of any kind in any paper in any part of the United States in over ten years. We have always followed the policy, if labor was needed, of inquiring of our own organization if they had any friends in the home town whom they would care to recommend. In this manner we have always been able to recruit a very efficient force of excellent workmen, and have found it far more effective than any advertising.

"In the past year, however, even this has been unnecessary as there has always been a surplus of labor in Akron—the source of which we have no knowledge. It is Goodyear's definite policy before hiring any new employees to take back into our shop as fast as business conditions warrant those laid off who care to return. So far, we have been able to take back only a small percentage of those laid off; and until we have taken them all back, we hope Goodyear employees will do everything they can to prevent their friends and relatives coming here from other towns and swelling the ranks of unemployed in Akron."

Consulting Rubber Technologist

PRACTICAL

Twenty years' experience with the largest and most successful companies in the country

Physical and Chemical Testing
Special facilities for abrasion and quick age tests

Expert Advice to Correct Factory Trouble

New Processes and Formulas Developed

R. R. Olin Laboratories
P. O. Box 272, AKRON, OHIO
Telephones: Barberton 828, Portage 5895W

CATALPO

for

Frictions

Goodrich Sales Conference

District sales and advertising managers of the B. F. Goodrich Rubber Company were in conference at the Akron headquarters offices last month. Sales and advertising programs occupied the attention of the district men during several daily sessions of the conference.

American Cyanamid Buys Firm

The American Cyanamid Company on January 30 announced the acquisition of the Beaver Chemical Corporation, Damascus, Va., manufacturer of dyestuffs specializing in sulfur colors and alizarines. Beaver Chemical was originally organized over 20 years ago and had formerly marketed its dyestuffs through the General Dyestuffs Corporation.

GENERAL TIRE SALESMEN AT AKRON CONFERENCE

Two hundred salesmen from various parts of the United States representing the General Tire & Rubber Company attended a sales conference in Akron from January 20 to 24. At a dinner on the opening day of the session, speakers were William O'Neil, president of the company, and L. A. McQueen, trade sales manager.

Others who addressed the salesmen during the week were S. S. Poor, sales manager; C. J. Jahant, vice-president and superintendent; Robert Iredell, chief engineer; A. B. Stiller, advertising manager; H. B. Pushee, H. J. Conroy, F. G. Gabble, V. H. Orr and J. C. Fouche. A banquet at the Portage Country Club on the evening of January 23 was one of the features of the conference.

GOODYEAR PRIZES REWARD AIRSHIP LANDING IDEAS

Awards for airship landing suggestions, solicited last summer by the Goodyear Tire & Rubber Company, were made last month. The first prize of $150 was presented to E. W. Leatherman, who, the judges claimed, offered the best worked out possibilities for ultimate development. The second prize of $100 was split between H. H. Haines and C. W. Brannigan, Goodyear pilot, whose suggestion, according to the judges, presented the best possibilities for immediate use. Wilhelm Fischer won the third prize of $50.

Ideas for simplifying the work of mooring and docking an airship, submitted by more than 200 Goodyear workers, ranged from casting a net over the bag and having a huge magnet attract the ship to thrusting harpoons into the earth from the airship and pulling it to earth by ropes. The judges were W. C. State, chairman; Dr. Karl Arnstein, Z. W. Wicks, Jack Boettner, Karl Fickes and G. R. Burrell.

The principles of the suggestion by Mr. Leatherman included a movable short mooring mast, a device to prevent rolling, reversible propellors of power plants, static control of vertical motion, mechanical means of making contact, illumination of the landing field, and some means of increasing the stability of the motive unit.

3,000,000-LB. SOUTHWARK TESTING MACHINE SHOWN

The Test Equipment Division of the Southwark Foundry & Machine Company, 400 Washington Avenue, Philadelphia, Pa., has just completed the construction of a Southwark-Emery Universal Testing Machine of 3,000,000 lbs. capacity which will be on display in their shop until February 21. Engineers who might be interested in inspecting this machine are invited by the manufacturers to pay their plant a visit.

The machine has a maximum opening for tension and compression of 38 feet, six inches, and a clear distance between columns of seven feet, six inches, and a 36-inch stroke. A control cabinet provided with each machine contains the dials, recorders and all electric and hydraulic controls. The machine is of the single cylinder type with the Emery weighing system in the central crosshead, being able to accommodate transverse specimens limited in length only by the size of the building.

CLASSIFIED ADVERTISING

Five cents a word, minimum charge $2.00, payable in advance.
Address replies to Box Numbers
THE RUBBER AGE
250 West 57th St., New York City

POSITION WANTED

YOUNG MAN, ambitious, with over eleven years practical experience, also executive, in all departments, chiefly in mechanical rubber goods manufacturing; capable of handling any position in above line. Will consider any offer. Address Box 547, THE RUBBER AGE.

HELP WANTED

CHEMIST

A large distributor of rubber compounding ingredients has an opening for a young chemist with about two years' compounding experience, for laboratory and technical sales work. Give complete record of experience and salary expected in first letter. Address Box 546, THE RUBBER AGE.

WANTED—A man to go to France to work as a salesman and demonstrator. Should preferably be single; have technical training and experience in compounding. Knowledge of language not necessary at this time. Address Box 548, THE RUBBER AGE.

EQUIPMENT WANTED

WANTED—New or second-hand motor driven Rap-A-Tire Machines. Advise condition, motor rating, location and price. Address the Fisk Rubber Company, Chicopee Falls, Mass. Desk No. 5.

LATE MARKET PRICES

RUBBER—COTTONS AND FABRICS—CHEMICALS

NEW YORK, FEBRUARY 3, 1930

RUBBER

Crude

DURING January the closing price for smoked ribbed sheets at New York averaged 15.24 cents a pound, marking the sixth consecutive monthly decline and once again making a new low for the period from October, 1922, to date. February has opened with no sign of anything that can be construed as a bullish movement in the commodity, and the closing spot price on February 3 was exactly 15 cents.

Price quotations both on the Rubber Exchange and on the outside market indicate that the distant positions are suffering more than the spot and nearby deliveries. On January 20, with the spot price at 14¾ cents, the range for April-June deliveries was from 15½ to 15¾ cents a pound. On February 3, however, with the spot price up to 15 cents, the range for April-June rubber has dropped to from 15⅛ to 15⅜ cents a pound. Futures on the Exchange are also lower despite the fact that the spot and nearby months have gained.

The market at the close of the period was dull and featureless, with trading confined to professional operators. A general belief prevailed that tire plants would cut down schedules rather than increase them this month.

Prices quoted on the New York outside market on February 3 were as follows:

Plantations—

Ribbed Smoked Sheets—		
Spot-Feb.	.14⅞@	.15⅛
Mar.	.15⅛@	.15⅜
Apr.-June	.15⅜@	.15⅝
First Latex, crepe spot	.15⅛@	.15⅜
Amber Crepe, No. 2	.13⅞@	.14⅛
Amber Crepe, No. 3	.13⅝@	.13⅞
Amber Crepe, No. 4	.13 @	.13¼
Brown Crepe, Clean thin	.13⅝@	.13⅞
Brown Crepe, specky	.13 @	.13½
Liquid Latex, per gal.	.90 @	

Paras—

Up-river Fine	.16¼@	.16½
Up-river Medium	Nominal	
Up-river Coarse	.08¼@	.08⅓
Acre Bolivian, fine	.16¾@	.17
Caucho Ball, Upper	.08¼@	.08½
Islands, fine	Nominal	

Centrals—

Central, scrap	.08¼@	—
Esmeraldas	.08¼@	—

Balata—

Block, Colombia	Nominal	
Block, Ciudad	.41 @	.42

LONDON MARKET

Standard Ribbed Smoked Sheets—Buyers		
Spot-Feb.	@	7½d
Mar.	@	7⅝d
Apr.-June	7¾@	7⅞d

SINGAPORE MARKET

Standard Ribbed Smoked Sheets—Sellers		
Spot	7⅛@	7¼d

Scrap

Scrap rubber has not changed in price appreciably during the past fortnight, and the demand apparently has remained stable. Reclaimers are not expected to raise their production schedules to any great extent until the start of spring. Late prices follow:

(Prices to Consumer)

Auto tire peelings	ton	35.00	@37.50
Standard White auto	ton	45.00	@47.50
Mixed auto	ton	21.00	@22.50
Bicycle tires	ton	18.50	@20.00
Clean solid truck tires	ton	25.00	@26.00
Boots and shoes	cwt.	1.40	@ 1.45
Arctics, untrimmed	lb.	.00⅞@	.01
Inner tubes, No. 1	lb.	.07¼@	.07⅓
Inner tubes, No. 2, compounded	lb.	.03⅞@	.04
Inner Tubes, Red	lb.	.04 @	.04¼
Air Brake Hose	ton	22.50	@25.00
Rubber Hose	ton	17.50	@20.00

Reclaimed

Consumption of reclaimed rubber during January is believed to have increased in proportion to the gain in crude rubber. That there will be a slight decline in the present month is also expected, but March should see the beginning of a steady rise in the use of reclaim. Prices, in sympathy with the lowered quotations for crude rubber, dropped during the fortnight and closed the period as follows:

High Tensile

Super-Reclaim No. 1 Black	lb.	.11¾@	.12
High Tensile Red	lb.	.10¾@	.11

Shoe

Unwashed	lb.	.07 @	.07¼
Washed	lb.	.09 @	.09½

Tube

No. 1 (Floating)	lb.	.12 @	.12¼
No. 2 (Compounded)	lb.	.09 @	.09½

Tires

Black	lb.	.07 @	.07¼
Black, selected tires	lb.	.07¼@	.07⅓
Dark Gray	lb.	.08 @	.08½
Light Gray	lb.	.09½@	.10
White	lb.	.11 @	.11½
Truck, Heavy Gravity	lb.	.07 @	.07¼
Truck, Light Gravity	lb.	.07¼@	.07⅓

Miscellaneous

Mechanical blends	lb.	.06 @	.06½
Red	lb.	.10½@	.11

COTTON and FABRICS

Cotton

DURING the month of January, the average closing spot price quotation for middling upland cotton at New York was 17.21 cents a pound, as compared with 17.28 cents in December and with 20.22 cents in January, 1929. This is the lowest monthly average since June, 1927, but only partially indicates the blow which the commodity has received in the past fortnight.

After several minor recessions toward the end of January, the market for raw cotton declined abruptly on February 3 to close at 16.10 cents a pound for spot middling upland. March cotton, which sold on January 20 at 17.32 cents a pound touched a low of 15.85 cents, and other deliveries were hit as hard. A rise is expected in the next few days, however, to correct the technical position of the market.

The high, low and closing prices on the New York Cotton Exchange on February 3 were as follows:

	High	Low Feb. 3	Close	Close Jan. 20
Mar.	16.22	15.85	15.96	17.32
May	16.45	16.08	16.20	17.52
July	16.70	16.31	16.41	——

Tire Fabrics

Tire fabric prices were lower with the drop in raw cotton, closing as follows:

CORD

Peeler, carded, 23/5/3	lb.	.43½@	.44
Peeler, carded, 23/4/3	lb.	.45½@	.46
Peeler, carded, 13/3/3	lb.	.41 @	.41½
Peeler, carded, 15/3/3	lb.	.41½@	.42
Egyptian, carded, 23/5/3	lb.	.48½@	.48¾
Egyptian, combed, 23/5/3	lb.	.54½@	.54¾

CHAFERS

Carded, American, 8 oz.	lb.	.37 @	.37½
Carded, American, 10 oz.	lb.	.38 @	.38½
Carded, American, 12 oz.	lb.	.37 @	.38
Carded, American, 14 oz.	lb.	.35½@	.41

LENO BREAKER

Carded, American, 8¼ oz.	lb.	.38 @	.42
Carded, American, 10¼ oz.	lb.	.38 @	.42

SQUARE WOVEN

Carded, American, 17¼ oz. 23-11 ply	lb.	.43½@	.44½
Carded, American, 17¼ oz. 10-ply	lb.	.36 @	.36½

Sheetings

Sheetings were fractionally lower at the close of the fortnight, with closing quotations, according to the Textile Brokers Association, as follows:

40-inch, 2.50-yard	yd.	.11⅝@	.11½
40-inch, 2.85-yard	yd.	.09⅝@	.09⅞
40-inch, 3.15-yard	yd.	— @	.10⅝
40-inch, 3.60-yard	yd.	— @	.08⅞
40-inch, 3.75-yard	yd.	.07⅞@	.08
40-inch, 4.25-yard	yd.	— @	.06⅞

Ducks

Only scattered sales of small lots were reported in the cotton duck market. Prices, which were unchanged except for a decline in enameling ducks, closed as follows:

Belting and Hose	lb.	.34½@	.35
Enameling	lb.	.32 @	.32½
Single filling	lb.	.15 @	.16
Double filling	lb.	.16¼@	.17½

CHEMICALS

THE readjustments made in the price of carbon black during the past month have served to some extent to improve the demand for this compounding material from rubber manufacturers. Steady and increasing amounts of orders for accelerators and anti-oxidants have been a notable feature of the period, indicating that rubber companies are preparing for a resumption of fairly high production schedules. The past month has also seen the introduction of a new anti-oxidant under the name of B-L-E. That 1930 may yet be a rival to 1929 in the matter of mergers in the industry is indicated by the announcement that the American Cyanamid Company has acquired the Beaver Chemical Corporation, a dyestuffs manufacturer.

ACCELERATORS

Organic

A-1	lb.	.24	@	.27
A-5-10	lb.	.33	@	.36
A-7	lb.	.55	@	.59
A-11	lb.	.62	@	.66
A-16	lb.	.57	@	.61
A-19	lb.	.58	@	.62
A-20	lb.	.64	@	.68
A-32	lb.	.90	@	.95
Aldehyde ammonia, crystals	lb.	.65	@	.70
Aniline oil, drums, f.o.b. works	lb.	.15	@	.16
Captax	lb.	.60	@	.70
Crylene	lb.	.55	@	.65
paste	lb.	.45	@	.55
Di-Ortho-Tolyguanidine	lb.	.42	@	.44½
Diphenylguanidine	lb.	.30	@	.32½
Dipsol	lb.	4.30	@	4.50
Ethylidene aniline	lb.	.45	@	.47½
Formaldehyde aniline	lb.	.40	@	.42½
Heptene	lb.	.40	@	—
Hexamethylene-tetramine	lb.	.58½	@	.61
Lithex	lb.	.18	@	.20
Methylenedianiline	lb.	.37½	@	.40
Monex	lb.	3.25	@	—
Oxynone	lb.	.68	@	.80
Phenex	lb.	.75	@	—
R & H 40	lb.	.40	@	.42½
R & H 50	lb.	.40	@	.42½
R & H 397	lb.	.75	@	.77½
R-2	lb.	1.95	@	2.15
Safex	lb.	1.20	@	1.25
SPDX	lb.	.75	@	—
Super-Sulphur No. 1	lb.	.50	@	.52
No. 2	lb.	.18	@	.25
Tensilac, No. 39	lb.	.40	@	.42½
Tensilac, No. 41	lb.	.50	@	.52½
Thermio F	lb.	.50	@	.55
Thiocarbanilid, drums	lb.	.25½	@	.28½
Trimene	lb.	.75	@	—
base	lb.	1.20	@	—
Triphenylguanidine	lb.	.58	@	.62½
Tuads	lb.	3.25	@	3.50
Ureka	lb.	.75	@	1.00
Vulcanex	lb.			
Vulcone	lb.			
Vulcanol	lb.			
Z 88	lb.	.50	@	.60
Zimate	lb.	4.00	@	5.00

Inorganic

Lead, sublimed blue	lb.	.08¼	@	—
Lead, white	lb.	.08½	@	.08¾
Litharge, domestic	lb.	.09¼	@	.11
Magnesia, calcined, light	per 100 lb.	5.35	@	5.45
heavy	per 100 lb.	3.65	@	3.75

COLORS

Blacks (See Compounding Materials)

Blues

Prussian	lb.	.35	@	.36
Ultramarine	lb.	.06	@	.32

Browns

Sienna, Italian	lb.	.05½	@	.12½
Umber, Turkey	lb.	.04½	@	.07

Greens

Chrome, light	lb.	.30	@	.32
medium	lb.	.31	@	.33
dark	lb.	.34	@	.36
Chromium Oxide, bbl.	lb.	.34½	@	.35½

Reds

Antimony crimson, 15/17	lb.	.40	@	.44
sulfur, free	lb.	.56	@	.66
golden 15/17 F.S.	lb.	.20	@	.25
Indian English	lb.	.08	@	.11
Domestic (Maroon)	lb.	.11	@	—
Oximony	lb.	.13¼	@	—
Red oxide, pure	lb.	.10	@	.12
Venetian red	lb.	.03	@	.06
Vermillion, quicksilver, English	lb.	2.00	@	2.05

Whites

Lithopone, Akcolith	lb.	.05 3/5	@	.06
Lithopone, Albalith	lb.	.05¼	@	.05¾
Lithopone, Azolith	lb.	.05¼	@	.05¾
Lithopone, Vanolith	lb.	.05¾	@	—
Titanox B, f.o.b. St. Louis,	lb.	.07¼	@	.07¾
Titanox C, f.o.b. St. Louis,	lb.	.07¾	@	.08¼

Zinc Oxide—American Process

American Azo:				
ZZZ (lead free)	lb.	.06½	@	.07
ZZ (leaded)	lb.	.06⅝	@	.06⅞
Horsehead Brand:				
Special	lb.	.07	@	.07½
XX Green	lb.	.07	@	.07½
XX Red, lead free	lb.	.06½	@	.07
Kadox, black label	lb.	.10⅝	@	.10⅞
blue label	lb.	.09⅝	@	.09⅞
red label	lb.	.08	@	.08½

Zinc Oxide—French Process

White seal	lb.	.11⅝	@	.11⅞
Green seal	lb.	.10⅝	@	.10⅞
Red seal	lb.	.09⅝	@	.09⅞

Yellows

Chrome	lb.	.17	@	.17½
Ocher, French medium	lb.	.02	@	.03
domestic	lb.	.01⅝	@	.02

COMPOUNDING MATERIALS

Aluminum Flake	ton	21.85	@	24.50
Ammonia carbonate, lump	lb.	.07½	@	.07¾
Asbestine	ton	14.75	@	18.00
Barium carbonate	lb.	.03½	@	.05
Barium Dust	lb.	.05	@	.06
Barytes southern off-color	ton	12.00	@	18.00
Western prime white	ton	23.00	@	—
imported	ton	27.00	@	36.00
Basofor	lb.	.04½	@	—

Blacks

Arrow "Aerfloted"	lb.	.06½	@	.12
Bone Black	lb.	.07	@	.08½
Carbon, compressed	lb.	.06	@	.11
Carbon, uncompressed	lb.	.05¾	@	.10
Disperso, f.o.b. Louisiana	lb	.056	@	—
Disperso, f.o.b. Texas	lb.	.05½	@	—
Drop Black	lb.	.06	@	.14
Fumonex	lb.	.04½	@	.08
Excello, compressed	lb.	.05½	@	.10
Gastex, f.o.b. Texas	lb.	.04¼	@	.05½
Lamp Black	lb.	.12	@	.40
Micronex	lb.	.06½	@	.12
Thermatomic-Thermax	lb.	.04	@	.07
Flex	lb.	.05	@	.08
P-33	lb.	.06	@	.09
United carbon, fob Tex.	lb.	.06	@	—
Velvetex carbon	lb.	.04	@	.06
Blanc fixe dry f.o.b. works	ton	75.00	@	90.00
Carrara filler	lb.	.01¾	@	.02
Catalpo (fact.)	lb.	.02	@	—
Clay, China, domestic	ton	8.00	@	9.00
Aerfloted Suprex	ton	10.00	@	22.00
Congaree, c. l. f.o.b. mine	ton	9.00	@	—
Dark Blue Ridge	ton	9.00	@	20.00
Dixie	ton	15.00	@	29.00
Langford	ton	10.00	@	—
Lexington	ton	10.00	@	22.00
Mineral Flour, c. l. fob mine	ton	20.00	@	23.00
Par	ton	7.00	@	—
Tensulite		15.00	@	—
Glues, extra white	lb.	.22	@	.26
medium white	lb.	.20	@	.24
Magnesia, carbonate	lb.	.08¾	@	.11
Mica, white water grnd.	lb.	.06	@	.08
Off color (biotite)	lb.	.05	@	.07
Rotten Stone powdered)	lb.	.02	@	.05
Soapstone, powdered	ton	15.00	@	22.00
Starch, powdered	cwt.	3.82	@	4.02
Talc, domestic	ton	12.00	@	15.00
Pyrax A	ton	7.50	@	—
Whiting, commercial	cwt.	1.00	@	1.25
English cliffstone	cwt.	1.75	@	2.00
Quaker	ton	13.00	@	22.00
Superfine	ton	10.00	@	12.00
Sussex	ton	8.00	@	15.00
Witco	ton	20.00	@	—
Zinc Carbonate	lb.	.09½	@	.10½
Zinc Stearate	lb.	.23½	@	.25

MINERAL RUBBER

Genasco (factory)	ton	50.00	@	52.00
Granulated M. R.	ton	30.00	@	45.00
Hard Hydrocarbon	ton	24.00	@	40.00
Paradura	ton	62.50	@	65.00
Pioneer, MR, solid	ton	40.00	@	42.00
Pioneer-granulated	ton	50.00	@	52.00
R & H Hydro-Carbon	ton	27.05	@	29.00
Robertson, MR, solid	ton	34.00	@	80.00
M.R. (gran)	ton	38.00	@	80.00

SOFTENERS

Acids

Nitric, 36 degrees	cwt.	5.00	@	5.25
Sulfuric, 66°	cwt.	1.60	@	1.95
Tartaric, crystals	lb.	.38	@	.38½

Acids, Fatty

Stearex	lb.	.15	@	.19
Stearic, double pressed	lb.	.17	@	.22

Alkalies

Caustic soda, 76%	cwt.	3.76	@	3.91
Soda ash, 58% C.L.	cwt.	1.40	@	

Oils

Corn, refined, bbls.	lb.	.07¾	@	.09⅛
Cottonseed, crude		—	@	.07⅛
Cycline	gal.	.27	@	.34
Degras (c.l. 100 bbls.)	lb.	.03¾	@	—
Less c. l. (10-25 bbls.)	lb.	.04	@	—
Lots less than 10 bbls.	lb.	.04¼	@	.04⅛
Fluxrite	lb.	.05½	@	.06½
Palm Lagos	lb.	.07¾	@	—
Niger	lb.	.07½	@	—
Para-Flux	gal.	.17	@	—
Petrolatum, white	lb.	.08	@	.08½
Pigmentaroil	gal.	.21	@	.26
Pine, steam distilled	gal.	.65	@	.70
destructively distilled	gal.	.55	@	.58
Witco Palm Oil	lb.	.11	@	—
Witco Softener (f.o.b. works)	lb	.02	@	—

Resins and Pitches

Pitch, Burgundy	lb.	.06½	@	.07⅛
coal tar	gal.	.05½	@	.06
pine, 200 lb. gr. wt.	bbl.	9.00	@	10.00
Rosin, grade K, 280 lb.	bbl.	—	@	8.55
Pigmentar	lb.	.038	@	.0446
Tar Retort, 50 gal.	bbl.	13.50	@	15.00

Solvents

Acetone, pure	lb.	.11	@	.18
Alcohol denatured, No. 1 bbls.	gal.	.51	@	—
Benzol, 90%	gal.	.23	@	.25
Carbon bisulphide	lb.	.05½	@	.06¼
Carbon tetrachloride	lb.	.06¼	@	.07
Dryolene (f.o.b. Okla.)	gal.	.10	@	.10½
Motor gasoline, steel bbls.	gal.	.16	@	—
Naptha, solvent	gal.	.35	@	.40
Rub-Sol (f.o.b .Okla.)	gal.	.09	@	—
Turpentine, spirits	gal.	.58	@	.59
wood	gal.	—	@	.50
destructively distilled	gal.	.40	@	.43

Waxes

Beeswax, white	lb.	.51	@	.53
Carnauba	lb.	.35	@	.36
Ceresin, white	lb.	.10	@	.11
Montan, crude	lb.	.06½	@	.07
Ozokerite, black	lb.	.24	@	.25
green	lb.	.26	@	.30

Paraffin (c. l.—f.o.b. N. Y.)

Yellow crude scale	lb.	.03¾	@	
White crude scale 124/126	lb	.04	@	
Refined, 125/127	lb.	.05⅝	@	
Refined, 128/130	lb.	.05½	@	
Refined, 135/137	lb.	.07¾	@	
Refined, 138/140	lb.	.08¼	@	

ANTI-OXIDANTS

Agerite, Resin	lb.	.57	@	.62
Powder	lb.	.57	@	.62
White	lb.	1.10	@	1.20
Albasan	lb.	.70	@	.75
Antox	lb.			
B-L-E	lb.	.57	@	.60
Neozone	lb.			
Oxynone	lb.	.68	@	.80
Resistox	lb.	.54	@	.57
Stabilite	lb.	.57	@	.62
Stabilite Alba	lb.	.70	@	.75
VGB	lb.	.55	@	.66

SUBSTITUTES

Black	lb.	.08	@	.14
White	lb.	.10	@	.16
Brown	lb.	.08	@	.15

VULCANIZING INGREDIENTS

Sulfur Chloride (drums)	lb.	.03¼	@	.03½
Sulfur flour, Refined, 100% pure (bags)	cwt.	2.40	@	2.75
Commercial (bags)	cwt.	1.75	@	2.10
Vandex	lb.	1.80	@	2.10

TIRES & TUBES
CRUDE RUBBER

STATISTICAL SECTION

AUTOMOBILES
GASOLINE

ONE authority has estimated arrivals of crude rubber in the United States at 46,220 long tons for January and at 42,000 long tons for February. With domestic consumption for these two months in the neighborhood of 65,000 long tons, it seems likely that stocks on hand in this country will be increased to a total of nearly 125,000 long tons by the end of February.

Meanwhile, London and Liverpool stocks of crude rubber continue to increase, although at not quite the alarming rate of last fall. By February 1, stocks at these two British ports had mounted to a total of 80,358 long tons as compared with 73,319 long tons on the last Saturday in December. Rubber stocks at Singapore and Penang are also advancing, and there is little doubt but that official figures for other world ports and for estate stocks will also show gains.

The rigorous winter weather that has increased rubber footwear business also brought December gasoline consumption down slightly below the figure for December, 1928, thus indicating less tire wear throughout the country than is usual for that month. Final figures for United States and Canadian automobile production give a total of 5,621,656 cars and trucks for the year of 1929.

Latest figures covering imports and exports from the leading producing and consuming countries have been added to the appropriate tables in this section.

PLAN OF THE SECTION

The statistics included in this section have been chosen for their constant importance to the rubber industry. The tables are reprinted in the same relative position in every issue, each table being kept current by the addition of new figures as soon as they become available.

Table of Contents

United States Rubber Imports and Exports
Rubber Consumption in the United States
Rubber Invoiced to the United States
Daily Rubber Prices in New York
Monthly and Annual Rubber Prices
London Official Rubber Prices
Daily Cotton Prices in New York
Stocks of Crude Rubber in the U. S.
Rubber in London and Liverpool
Rubber in Singapore and Penang
United States Tire and Tube Statistics
Automobile Production—U. S. and Canada
Rims Inspected and Passed in the U. S.
United States Consumption of Gasoline
Rubber Exports from Producing Countries
Rubber Imports into Consuming Countries
Production of Misc. Rubber Goods
Imports of Guayule and Related Gums
Consumption, etc., of Reclaimed Rubber

U. S. Imports and Exports of Crude Rubber

	Gross Imports			Re-exports			Net Imports
YEARS	Long Tons	Total Declared Value	Average Declared Value per pound Cents	Long Tons	Total Declared Value	Average Declared Value per pound Cents	Long Tons
1921	185,394	73,772,677	17.76	5,716	2,414,924	18.86	179,678
1922	301,076	101,843,188	15.10	4,809	1,921,828	17.84	296,267
1923	309,144	185,060,304	26.72	8,772	5,672,319	28.87	300,372
1924	328,056	174,231,331	23.71	10,309	6,057,637	26.23	317,747
1925	396,642	429,705,014	48.36	14,827	19,847,753	59.76	381,815
1926	413,338	505,817,807	54.63	17,671	23,470,588	56.77	395,667
1927	426,258	339,874,774	35.60	27,775	24,795,488	39.76	398,483
1928	489,781	244,854,978	25.03	32,159	18,128,361	28.17	407,572
1929	560,084	239,178,783	19.15				
1927:							
Jan.	43,340	36,758,719	37.86	1,525	1,444,784	42.28	41,815
Feb.	28,337	23,110,287	36.41	2,451	2,277,297	41.47	25,886
Mar.	35,515	28,693,016	36.07	2,763	3,249,665	52.50	32,752
Apr.	46,202	37,321,505	36.06	1,575	1,428,425	40.48	44,627
May	36,518	30,964,377	37.88	2,782	2,501,562	40.14	33,736
June	33,045	27,850,014	37.62	1,775	1,550,592	39.00	31,270
July	37,677	31,678,259	37.53	1,958	1,560,853	35.59	35,719
Aug.	32,810	26,396,931	35.92	1,809	1,382,768	34.12	31,001
Sept.	33,301	25,314,412	33.94	3,500	3,036,929	38.74	29,801
Oct.	30,184	22,163,282	32.78	2,513	2,042,713	36.29	27,671
Nov.	38,592	27,395,428	31.69	2,469	2,014,196	36.43	36,123
Dec.	30,737	22,213,574	32.26	2,655	2,245,754	37.77	28,082
1928:							
Jan.	39,107	30,278,444	34.56	1,988	1,734,990	38.95	37,119
Feb.	33,663	27,763,655	36.82	2,738	2,229,589	36.35	30,925
Mar.	40,611	32,103,042	35.29	3,718	2,587,435	31.07	36,893
Apr.	37,935	27,287,266	32.11	2,272	1,415,024	27.80	35,663
May	31,059	19,058,672	27.39	2,399	1,386,307	25.80	28,660
June	27,765	14,121,219	22.71	2,621	1,400,697	23.86	25,144
July	31,258	14,144,765	20.20	3,087	1,451,446	20.99	28,171
Aug.	31,204	12,860,150	18.39	2,377	1,084,646	20.37	28,827
Sept.	39,835	16,512,019	18.50	3,038	1,384,148	20.34	36,797
Oct.	44,058	18,200,332	18.44	2,405	1,085,407	20.15	41,653
Nov.	36,519	14,878,441	18.19	2,788	1,207,089	18.52	33,731
Dec.	43,511	17,580,966	18.04	2,738	1,165,748	19.00	40,773
1929:							
Jan.	57,584	22,872,943	17.74	3,683	1,773,401	21.61	53,901
Feb.	64,268	24,760,111	17.20	2,955	1,374,783	20.77	61,310
Mar.	50,604	20,380,905	17.98	4,218	2,094,037	22.16	46,386
Apr.	55,725	25,542,726	20.46	3,293	1,624,237	22.02	52,432
May	51,161	24,855,511	21.25	2,386	1,349,690	21.24	48,325
June	41,663	18,799,307	20.14	3,152	1,470,746	20.83	38,511
July	43,944	19,342,147	19.65	3,424	1,590,411	20.78	40,520
Aug.	37,222	16,530,090	19.88	2,644	1,232,217	20.80	34,578
Sept.	34,472	15,214,485	19.70	2,011	861,068	19.11	32,461
Oct.	38,163	16,192,261	18.94	2,614	1,190,510	20.38	35,549
Nov.	43,507	18,189,305	18.66	2,929	1,300,354	19.82	40,578
Dec.	42,952	17,573,330	18.27				

U. S. Consumption of Crude Rubber

(Rubber Manufacturers' Association statistics raised to 100 per cent—All figures in long tons)

Figures on Monthly Basis

	1922	1923	1924	1925	1926	1927	1928	1929
Jan.	16,938	30,106	29,058	29,638	32,196	31,518	34,403	43,001
Feb.	14,767	30,149	25,736	29,761	31,136	30,137	33,702	41,594
Mar.	21,408	36,629	28,385	33,498	32,936	36,141	35,688	44,730
Apr.	19,294	29,085	27,129	34,139	32,696	35,871	32,772	47,531
May	23,246	36,155	25,845	35,322	29,364	34,592	37,333	49,238
June	31,713	24,272	22,753	35,822	28,598	33,801	37,676	43,227
July	24,522	17,685	23,396	36,053	27,577	29,219	37,407	41,526
Aug.	29,631	20,359	28,982	35,909	34,533	33,460	42,927	38,274
Sept.	24,410	17,594	31,497	31,691	32,904	27,214	39,882	34,707
Oct.	26,881	21,321	31,520	29,047	29,836	26,790	40,857	34,80[illegible]
Nov.	24,950	20,437	27,289	28,853	28,080	26,792	37,461	27,65[illegible]
Dec.	25,070	31,902	27,199	28,748	26,293	25,492	31,232	23,5[illegible]
Totals	282,560	305,694	328,769	388,481	366,149	371,027	441,340	469,8[illegible]

Figures on Quarterly Basis

Quarter	1922	1923	1924	1925	1926	1927	1928	
Jan./Mar.		96,776	87,609	95,263	94,301	99,216	103,558	128 [illegible]
Apr./June	127,360	89,493	75,674	104,099	87,109	103,242	103,500	1[illegible]
July/Sept.		55,621	83,813	99,493	93,793	89,210	117,573	[illegible]
Oct./Dec.	155,067	68,617	92,656	85,789	83,212	80,860	117,597	
Totals	282,427	305,507	339,752	384,644	358,415	372,528	442,227	3[illegible]

Note—The Rubber Association estimates its monthly rubber consumption figures to be 90 per cent complete. Up until 1925 the quarterly figures were likewise estimated to be 90 per cent complete; beginning with 1925 an estimate of 92 per cent completeness has been used. These estimates have been used in raising the figures in this table to 100 per cent. The quarterly figures are generally regarded as the most authentic; the monthly figures may be accepted as preliminary.

Rubber Invoiced to the U. S.

(Reported by American Consuls—Quantities in Long Tons)

During the Week Ended	From Br. Malaya	From Ceylon	From Dutch East Indies	From London & Liverpool	Total
Nov. 2	7,776	960	2,012	51	10,799
Nov. 9	7,103	648	1,470	106	9,327
Nov. 16	5,584	571	1,960	52	8,167
Nov. 23	6,109	919	1,711	78	8,817
Nov. 30	6,672	1,404	2,205	9	10,290
Dec. 7	8,543	1,920	2,115	16	12,594
Dec. 14	7,428	1,299	1,655	6	10,388
Dec. 21	7,599	1,953	2,003	22	11,577
Dec. 28	4,943	364	1,856	5	7,168
Jan. 4	8,067	1,587	2,419	251	12,124
Jan. 11	7,235	931	1,469	15	9,650
Jan. 18	7,009	898	1,560	49	9,516
Jan. 25	9,212	1,103	2,051	14	12,380

Daily Spot Closing Prices of Ribbed Smoked Sheet Rubber—*New York Market, in Cents per Pound*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Ave.
1927																																
August	35¼	35⅛	35⅛	35⅝	35½	35½	—	35⅝	35⅝	35¾	35⅝	36	35⅝	—	35⅝	35⅝	35⅝	35⅝	35¾	35¾	—	35½	34⅞	34⅝	34¾	34¾	34¾	34¾	34	33⅝	34	35⅛
Sept.	34	33⅝	—	33⅝	—	33⅞	33⅝	33⅞	33½	—	34⅛	33⅝	34⅛	34	34	34⅛	34⅛	34⅛	34⅛	34⅛	34⅝	33⅞	33⅞	33⅝	33⅝	33⅝	33⅝	33⅝	33⅝	33⅝	—	33⅝
Oct.	33⅝	—	33⅛	33⅛	33⅛	33⅞	33⅞	33⅞	34	34⅛	34⅛	34⅛	34⅛	34⅛	34⅛	34⅛	34⅛	34⅛	34⅛	34⅛	34⅛	34⅛	34⅛	34⅛	34⅛	34⅛	34⅛	34⅛	34⅛	35¼	35¼	34⅝
Nov.	35	35⅛	35⅛	35⅝	—	—	36⅝	—	37	36⅝	36¼	—	36⅛	36⅜	37⅛	37⅛	37⅛	37⅛	37⅛	37⅛	37⅛	37⅛	37⅛	37⅛	37⅛	37⅛	37⅛	37⅛	37⅛	41¼	41¼	37½
Dec.	40½	40⅛	40⅛	—	40⅝	—	40½	40	40½	40½	—	40¾	40¾	40	39¾	40⅝	40⅝	—	40⅝	40⅝	40⅝	40⅝	40⅝	41⅛	41⅛	41⅛	41⅛	41⅛	41¼	41⅛	41½	40⅝
1928																																
January	—	—	41¼	41¼	41¼	41	41	—	40⅝	40½	40¼	40⅝	40½	40½	—	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	39¾	39¾	39¾	39¾	38⅝	40¼
February	37½	37⅜	37⅜	37⅝	—	36¾	37	36⅝	36⅝	36⅝	36⅝	36⅝	36⅝	36⅝	36⅝	36⅝	36⅝	36⅝	36⅝	36⅝	36⅝	36⅝	36⅝	36⅝	36⅝	36⅝	36⅝	36⅝	36⅝	36⅝	36⅝	36⅝
March	29	28⅞	28⅞	28⅞	28⅞	28⅞	28¾	28¾	28¾	28¾	28¾	28¾	28¾	28¾	28¾	28¾	28¾	28¾	28¾	28¾	28¾	28¾	28¾	28¾	28¾	28¾	28¾	28¾	28¾	28¾	28¾	28¾
April	—	27¾	27⅝	27⅝	27⅝	27⅝	27⅝	27⅝	27⅝	27⅝	27⅝	27⅝	27⅝	27⅝	27⅝	27⅝	27⅝	27⅝	27⅝	27⅝	27⅝	27⅝	27⅝	27⅝	27⅝	27⅝	27⅝	27⅝	27⅝	27⅝	27⅝	27⅝
May	17½	17¾	18⅛	19⅛	19⅛	19¾	—	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾
June	19¾	19¾	—	—	—	19	—	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾
July	—	18⅞	18⅞	19⅛	—	19	—	19¾	19¾	—	19½	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾
August	19½	19½	19½	19¾	19¾	19¾	20	—	—	19½	19½	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾
September	—	—	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	17⅞	18⅛	18⅛	18½	18⅜	19⅛	19⅛	19⅛	19⅛	18½	18½	18½	18½	18½	18½	18½	18½	18½	18½	18½	18½	18½	18½
October	18⅝	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	—	18⅞	17⅞	17⅞	17⅞	18	18	18	18	18	18	18	18	17⅞	17⅞	17⅞	17⅞	17⅞	18⅛	18⅛
November	18⅝	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞
December	17¾	17¾	—	17¾	17¾	18¼	18	18	—	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
1929																																
January	—	18¼	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛
February	22¾	22	21¾	21¾	22¼	22¼	22¼	22¼	22¼	22¼	22¼	22¼	22¼	22¼	22¼	22¼	22¼	22¼	22¼	22¼	22¼	22¼	22¼	22¼	22¼	22¼	22¼	22¼	22¼	22¼	22¼	22¼
March	26	26	26	26	26	26	25¾	25¾	25¾	25¾	25¾	25¾	25¾	25¾	25¾	25¾	25¾	25¾	25¾	25¾	25¾	25¾	25¾	25¾	25¾	25¾	25¾	25¾	25¾	25¾	25¾	25¾
April	23	23¼	22¾	22¾	22½	22½	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾
May	19¾	19¾	19¾	19¾	20¼	20¼	20¼	20¼	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21
June	21¼	21⅜	21⅜	21⅜	21¼	21¼	21¼	21¼	21¼	21¼	21¼	21¼	21¼	21¼	21¼	21¼	21¼	21¼	21¼	21¼	21¼	21¼	21¼	21¼	21¼	21¼	21¼	21¼	21¼	21¼	21¼	21¼
July	20⅝	21¼	21	21	21	21	21	21	21	22	22	22	21¾	21¾	21¾	21¾	21¾	21	21	21	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	21¼	21¼	21¼
Aug.	21⅝	21⅝	21	21	21	21	21	21	21	20⅞	20⅞	20⅞	20⅞	20⅞	20⅞	20⅞	20⅞	20⅞	20⅞	20⅞	20⅞	20⅞	20⅞	20⅞	20⅞	20⅞	20⅞	20⅞	20⅞	20⅞	20⅞	20⅞
Sept.	—	19½	19½	20⅛	20⅛	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼
Oct.	19¾	19½	19½	19¾	19¾	19¾	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Nov.	17¾	17⅞	—	17⅞	17⅞	—	17	17⅞	16¾	16¾	16¾	16¾	16¾	16¾	16¾	16¾	16¾	16¾	16¾	16¾	16¾	16¾	16¾	16¾	16¾	16¾	16¾	16¾	16¾	16¾	16¾	16¾
Dec.	—	16¼	16¼	16¼	16¼	16¼	16¼	—	—	16⅝	16⅝	16⅝	16⅝	16⅝	16⅝	16⅝	16⅝	16⅝	16⅝	16⅝	16⅝	16⅝	16⅝	16⅝	16⅝	16⅝	16⅝	16⅝	16⅝	16⅝	16⅝	16⅝
1930																																
January	—	15¾	15⅝	15⅝	—	15⅝	15⅝	15	14⅞	14½	14⅝	—	14⅞	14⅞	14¾	14⅜	15½	15½	—	14⅝	14⅞	14⅞	15¼	15¼	—	14⅝	14⅞	15¼	15¼	15¼	15¼	15¼
February	15¼	—	15⅝	15⅝	—	—	15																									

Average Spot Closing Prices—Ribbed Smoked Sheets

(New York Market)

Average Price per Pound for Years 1910-1921

Year	Cents	Year	Cents	Year	Cents
1910	206.60	1914	65.33	1918	60.15
1911	141.30	1915	65.85	1919	48.70
1912	121.60	1916	72.50	1920	26.50
1913	82.04	1917	72.23	1921	16.36

Average Monthly Price per Pound Since 1922

Months	1922 Cents	1923 Cents	1924 Cents	1925 Cents	1926 Cents	1927 Cents	1928 Cents	1929 Cents	1930 Cents
Jan.	18.82	32.73	25.86	36.71	79.50	38.75	40.25	20.14	15.24
Feb.	16.12	35.14	25.29	36.01	62.25	38.25	32.75	23.97	——
Mar.	14.53	34.21	22.83	41.00	59.00	41.04	26.82	24.55	——
Apr.	15.99	32.48	22.51	43.64	51.25	40.86	18.97	21.18	——
May	15.25	27.39	18.89	58.47	47.75	40.76	18.99	21.46	——
June	15.11	26.88	18.81	77.26	42.50	37.25	19.59	20.64	——
July	14.67	26.10	22.16	103.16	41.03	34.87	19.40	21.30	——
Aug.	13.93	28.84	26.17	82.99	38.50	35.12	19.46	20.59	——
Sept.	14.44	28.95	27.56	88.88	41.00	33.67	18.47	20.37	——
Oct.	19.78	26.93	31.13	98.01	42.50	34.32	18.83	19.67	——
Nov.	23.88	27.14	34.33	104.80	38.50	37.58	18.26	16.62	——
Dec.	27.42	26.60	37.88	98.51	38.25	40.63	17.97	16.12	——
Average for Year	17.50	29.45	26.20	72.46	48.50	37.72	22.48	20.55	——

London Closing Prices of Ribbed Smoked Sheet

(In Pence Per Pound)

Day	Nov.	Dec.	Jan.	Feb.	Day	Nov.	Dec.	Jan.	Feb.
1	8⅞	—	—	7⅝	17	—	8	7⅝	—
2	8⅝	8	7⅞	—	18	8⅛	8	7¾	—
3	—	7⅞	7¾	7½	19	8	7⅞	—	—
4	8¼	8	7⅝	—	20	8¼	7⅞	7¾	—
5	8½	8	—	—	21	8⅛	7⅞	7⅝	—
6	8⅜	8	7¾	—	22	8⅛	—	7⅝	—
7	8¼	8	7⅝	—	23	8⅛	7¾	7⅝	—
8	8¼	—	7⅝	—	24	—	7¾	7½	—
9	8⅛	8	7⅝	—	25	8⅛	—	7½	—
10	—	8	7⅛	—	26	8¼	—	—	—
11	8⅛	8⅛	7	—	27	8⅛	7⅞	7½	—
12	7⅞	8	—	—	28	8	7⅞	7½	—
13	7⅞	8	7¼	—	29	8	—	7½	—
14	8⅜	8	7¼	—	30	8	8	7½	—
15	8⅜	—	7¼	—	31	—	8	7½	—
16	8⅛	8	7½	—					

Average Monthly Price Per Pound

Month	1928 Pence	1929 Pence	1930 Pence	Month	1928 Pence	1929 Pence	1930 Pence
Jan.	19.310	9.942	7.471	Aug.	9.300	10.505	——
Feb.	15.713	11.875	——	Sept.	8.530	10.160	——
Mar.	12.736	12.135	——	Oct.	8.807	9.620	——
Apr.	8.864	10.490	——	Nov.	8.596	8.442	——
May	8.845	10.717	——	Dec.	8.570	7.958	——
June	9.293	10.580	——	Average			
July	9.312	11.065	——	for Year	10.656	10.291	——

Spot Closing Cotton Prices

(Middling Upland Grade—New York Market)

Recent Daily Price Per Pound

Day of Month	Jan.	Feb.	Day of Month	Jan.	Feb.	Day of Month	Jan.	Feb.
1	——	16.50	11	17.50	——	21	17.40	——
2	17.45	——	12	——	——	22	17.45	——
3	17.30	16.10	13	17.55	——	23	17.30	——
4	17.15	——	14	17.45	——	24	17.30	——
5	——	——	15	17.45	——	25	17.35	——
6	17.05	——	16	17.40	——	26	——	——
7	17.15	——	17	17.45	——	27	17.20	——
8	17.05	——	18	17.35	——	28	17.05	——
9	17.45	——	19	——	——	29	16.65	——
10	17.35	——	20	17.35	——	30	16.25	——
						31	16.35	——

Average Monthly Price Per Pound

Month	1928 Cents	1929 Cents	1930 Cents	Month	1928 Cents	1929 Cents	1930 Cents
Jan.	19.12	20.22	17.21	Aug.	19.28	18.62	——
Feb.	18.40	20.21	——	Sept.	18.67	18.83	——
Mar.	19.38	20.19	——	Oct.	19.62	18 46	——
Apr.	20.63	20.29	——	Nov.	19.84	17.53	——
May	21.58	19.41	——	Dec.	20.22	17.28	——
June	21.50	18.74	——	Average			
July	21.36	18.62	——	for Year	19.97	19.03	——

Stock of Crude Rubber in the U. S.

(All Quantities in Long Tons)

At End of	ON HAND			AFLOAT			ON HAND AND AFLOAT		
	1927	1928	1929	1927	1928	1929	1927	1928	1929
Jan.	76,172	110,244	76,342	45,312	41,256	78,596	121,484	151,500	154,938
Feb.	91,186	108,955	90,058	42,166	43,316	63,825	133,352	152,271	153,883
March	85,740	114,061	100,536	49,600	39,324	56,476	135,340	153,385	157,012
April	92,757	118,023	107,659	38,963	33,956	55,409	131,720	147,969	163,068
May	94,568	105,356	97,192	44,181	34,374	55,404	138,744	139,730	152,596
June	89,250	90,198	92,061	47,233	40,001	46,035	136,483	130,119	138,096
July	98,469	93,242	92,535	40,687	42,304	38,858	139,056	125,546	134,393
Aug.	96,148	68,994	90,769	40,937	51,875	41,618	137,085	120,869	132,387
Sept.	97,829	68,851	84,362	37,966	48,566	49,480	135,793	117,417	133,842
Oct.	97,452	66,421	88,483	42,804	41,571	62,294	140,256	107,992	150,777
Nov.	101,034	61,956	92,219	37,076	68,119	62,358	138,110	130,075	154,577
Dec.	100,130	66,166	105,138	47,938	68,764	62,389	148,068	134,930	167,527

(Rubber Manufacturers' Association figures raised to 100%.)

Stock of Crude Rubber in London

(No. of Tons in Wharves and Warehouses, including Latex)

At end of	1927	1928	1929	At end of	1927	1928	1929
Jan.	54,994	66,524	25,191	July	63,717	35,429	30,080
Feb.	58,826	62,964	25,554	Aug.	64,491	32,084	35,605
Mar.	63,055	58,272	28,214	Sept.	68,236	31,440	42,188
Apr.	66,897	53,425	31,368	Oct.	69,569	24,207	47,803
May	67,169	44,628	31,290	Nov.	67,050	17,775	52,454
June	63,902	38,756	31,025	Dec.	63,793	19,815	

At End of Recent Weeks
Stocks in London

	First Saturday	Second Saturday	Third Saturday	Fourth Saturday	Fifth Saturday
1929					
April	28,934	30,446	30,503	31,213	
May	31,580	31,127	30,955	30,893	
June	31,539	31,635	31,127	30,617	30,962
July	29,996	30,661	30,790	30,167	
August	30,927	31,444	33,573	34,651	35,605
September	36,620	37,901	40,151	42,077	
October	43,478	44,339	45,711	46,819	
November	48,092	49,302	50,068	51,012	52,538
December	53,431	53,180	53,894	54,260	
1930					
January	56,616	58,990	59,607	59,984	
February	60,460				

Stocks in Liverpool

1929					
April	4,442	4,591	4,521	4,779	
May	4,614	4,384	4,216	4,665	
June	4,642	4,750	4,733	4,515	4,628
July	4,393	4,547	4,757	4,739	
August	4,662	4,481	5,993	7,285	7,560
September	8,351	8,660	9,780	10,161	
October	10,795	11,571	11,788	12,665	
November	14,272	16,158	17,543	17,479	17,752
December	17,922	18,263	18,696	19,059	
1930					
January	19,438	19,640	19,515	20,063	
February	19,898				

Rubber in Singapore and Penang

(Stocks held by Dealers—Quantities in Long Tons)

End of	1927	1928	1929	End of	1927	1928	1929
Jan.	25,440	25,863	29,617	July	22,558	18,663	33,359
Feb.	26,766	22,867	32,373	Aug.	25,764	18,971	30,334
Mar.	27,844	20,538	29,437	Sept.	25,178	14,898	32,138
Apr.	24,543	16,946	28,474	Oct.	25,790	12,149	33,770
May	25,133	17,437	30,764	Nov.	28,369	29,188	30,963
June	21,898	18,207	30,403	Dec.	25,798	32,895	35,548

Rims Inspected and Passed in U. S.

(Tire and Rim Association Reports)

	Total	Per Cent Balloons		Total	Per Cent Balloons
1922	16,297,735	0.0	1926	24,199,524	78.3
1923	23,140,620	0.6	1927	19,700,003	79.1
1924	21,863,311	19.7	1928	24,247,282	81.6
1925	26,001,664	66.8	1929	24,141,502	80.3
1929					
January	1,835,207	79.4	July	1,896,666	78.2
February	2,265,024	80.8	August	1,570,099	79.4
March	2,613,389	80.4	September	2,110,008	80.7
April	2,729,899	81.3	October	1,647,350	76.4
May	2,574,224	76.5	November	596,989	64.7
June	2,184,219	75.3	December	879,259	79.0

U. S. Consumption of Gasoline

(In Barrels of 42 Gallons)

MONTHS	1928	1929	MONTHS	1928	1929
January	20,938,000	22,602,000	July	30,960,000	36,860,000
February	21,136,000	22,776,000	August	33,148,000	37,759,000
March	24,041,000	28,495,000	September	29,691,000	34,193,000
April	25,712,000	32,019,000	October	30,610,000	32,816,000
May	27,355,000	34,117,000	November	26,222,000	31,502,000
June	29,022,000	33,163,000	December	26,644,000	26,550,000

U. S. Tire and Tube Statistics

(All Figures Represent Thousands)

AUTOMOBILE CASINGS

Figures for Recent Years

	1922	1923	1924	1925	1926	1927	1928
Production	40,932	45,259	51,633	60,845	61,237	64,439	77,944
Shipments	39,987	45,204	50,120	59,262	59,002	64,059	74,296
Inventory[2]	6,132	5,772	7,427	8,142	10,456	10,264	13,624

Figures for Recent Months

	PRODUCTION			SHIPMENTS			INVENTORY		
	1927	1928	1929	1927	1928	1929	1927	1928	1929
Jan.	4,965	5,358	6,722	4,932	5,394	6,626	10,432	9,949	13,712
Feb.	5,095	6,363	6,912	4,458	5,031	5,282	11,075	11,721	15,495
Mar.	6,276	6,819	7,519	5,701	5,781	6,706	11,823	12,339	16,851
Apr.	6,299	6,178	7,884	5,701	5,812	7,294	12,122	12,71.	16,929
May	6,151	6,759	8,145	5,657	6,457	7,184	12,462	13,024	17,849
June	6,202	6,692	7,304	6,253	7,117	7,254	12,462	12,162	17,957
July	5,087	6,498	6,475	5,973	7,895	7,855	11,326	11,157	15,530
Aug.	5,752	7,469	5,806	6,393	8,403	7,845	10,721	10,034	14,226
Sept.	4,822	6,802	4,758	5,717	7,145	5,998	9,722	9,765	12,875
Oct.	4,773	7,326	4,919	4,799	5,717	4,960	9,665	11,520	12,845
Nov.	4,502	6,075	3,603	4,306	4,998	3,558	10,136	12,579	12,935
Dec.	4,497	5,605		4,165	4,591		10,264	13,624	

AUTOMOBILE INNER TUBES

Figures for Recent Years

	1922	1923	1924	1925	1926	1927	1928
Production	50,850	60,116	70,706	82,614	76,618	70,823	80,180
Shipments	49,673	59,072	68,016	81,004	71,591	72,896	77,127
Inventory[2]	7,643	8,425	11,052	11,313	16,200	13,692	16,117

Figures for Recent Months

	PRODUCTION			SHIPMENTS			INVENTORY		
	1927	1928	1929	1927	1928	1929	1927	1928	1929
Jan.	5,337	5,441	6,517	6,016	6,072	7,242	15,585	12,982	15,386
Feb.	5,658	6,895	6,769	5,120	5,431	5,278	16,075	14,650	16,999
Mar.	7,184	6,231	7,466	6,157	5,731	6,737	17,096	15,573	17,750
Apr.	7,373	6,661	7,634	6,359	5,702	7,164	17,801	16,638	18,184
May	6,737	7,168	7,660	6,140	6,300	7,038	18,389	17,702	18,928
June	6,306	6,953	6,978	6,832	7,136	6,950	17,858	17,159	18,741
July	5,284	6,674	6,178	7,070	8,729	8,113	16,004	14,974	16,322
Aug.	6,480	8,343	5,846	7,983	9,350	8,183	14,664	13,931	14,157
Sept.	5,651	7,103	5,536	6,758	7,154	6,250	13,511	13,543	13,424
Oct.	5,065	6,929	5,310	5,024	5,662	5,001	13,539	15,285	13,656
Nov.	4,775	5,592	3,780	4,723	5,002	3,712	13,585	15,743	13,701
Dec.	4,969	5,184		4,712	4,858		13,692	16,117	

(1) Rubber Manufacturers' Association figures, raised to 100%. The Association estimates its figures to be 75% representative or complete when issued and that basis has been accepted when preparing the statistics in this table.

(2) Held by manufacturers at end of period indicated.

Automobile Production

	United States			Canada			Grand Total
	Total	Passenger Cars	Trucks	Total	Passenger Cars	Trucks	
1923	4,020,255	3,631,728	388,527	146,438	129,228	17,210	4,166,693
1924	3,600,918	3,203,049	397,869	135,246	117,765	17,481	3,736,164
1925	4,265,704	3,760,459	505,245	161,389	139,311	22,078	4,427,093
1926	4,298,799	3,808,753	490,046	205,092	164,483	40,609	4,503,891
1927	3,393,887	2,938,868	453,019	179,426	146,870	32,556	3,573,313
1928							
Jan.	225,039	199,032	26,007	8,463	6,705	1,758	232,502
Feb.	323,368	290,830	32,358	12,504	10,315	2,189	335,872
March	412,825	371,408	41,417	9,724	7,478	2,246	422,549
April	409,948	364,877	45,071	24,240	20,546	3,694	434,188
May	425,990	375,798	50,192	33,942	29,764	4,178	459,932
June	396,967	356,439	40,528	28,399	25,341	3,058	425,366
July	390,445	337,933	52,512	25,226	20,122	5,104	415,671
Aug.	458,429	400,689	57,740	31,245	24,274	6,971	489,674
Sept.	413,722	358,872	54,850	21,193	16,572	4,621	434,915
Oct.	397,096	339,976	57,120	18,536	13,016	5,520	415,632
Nov.	256,936	217,256	39,680	11,769	8,154	3,615	268,705
Dec.	233,135	205,144	27,991	9,425	6,734	2,691	242,560
TOTAL	4,357,384	3,826,613	530,771	242,382	196,737	45,645	4,599,944
1929							
Jan.	402,154	350,617	51,537	21,501	17,164	4,337	423,655
Feb.	466,084	407,589	58,495	31,287	28,486	2,801	497,371
March	584,733	513,266	69,559	40,621	32,833	7,788	625,354
April	620,456	538,679	81,977	41,901	34,393	7,509	662,357
May	603,969	516,055	86,596	31,559	25,129	6,430	635,528
June	545,252	453,956	91,296	21,492	16,511	4,981	566,744
July	500,331	427,213	73,118	17,461	13,600	3,861	517,792
Aug.	499,629	444,711	54,918	14,214	11,037	3,177	513,843
Sept.	415,332	365,651	49,681	13,817	10,710	3,107	429,149
Oct.	380,011	321,195	58,816	14,523	8,975	5,548	394,534
Nov.	217,570	170,928	46,642	9,424	7,137	2,287	226,994
Dec.	119,950	92,717	27,233	5,495	4,426	1,069	125,445
TOTAL	5,358,361	4,603,609	754,752	263,295	210,400	52,895	5,621,656

Exports of Crude Rubber from Principal Producing Countries

(Long Tons)

	BRITISH MALAYA[1]								DUTCH EAST INDIES[4]						
	Gross Exports	Imports	Gross Exports Minus Imports	Ceylon[2]	India & Burma[3]	Sarawak[4]	British North Borneo[5]	Siam[4]	Java & Madura	Sumatra E. Coast	Other D.E.I.	Indo-China[3]	Amazon Valley	All Other[4]	World Total[7]
1923	252,016	70,432	181,584	39,971	6,416	5,705	4,237	1,718	32,930	46,844	57,822	5,067	16,765	7,856	406,958
1924	259,706	108,524	151,182	39,997	7,697	6,699	4,621	2,962	42,446	54,497	80,347	6,688	23,165	9.065	429,366
1925	316,825	158,022	158,803	49.566	10,082	5,424	5,377	5,377	46,757	65,499	120,626	7,881	25,298	13,797	517,523
1926	391,328	151,243	240,085	58,962	9,874	9,155	6,079	4,027	52,186	71,413	121,231	8,203	24,298	16,017	621,530
1927	371,322	182,845	188,477	55,356	11.321	10,923	6,582	5,472	55,297	77,815	142.171	8,645	28,782	15.633	606.474
1928	409,430	149,787	259,643	57,267	10,790	10,087	6,698	4,813	58,848	82,511	121,770	9,548	21,129	10,696	653,794
1928:															
Jan.	27,789	16,618	11,171	3,830	1,605	842	581	525	4,851	7,988	11,774	1,100	2,273	1,025	47,565
Feb.	28,848	12,911	15,937	4,947	1,081	667	581	536	4,052	6,757	8,630	787	1,612	1,276	46,860
Mar.	27,879	10,508	17,371	3,683	775	645	581	269	3,999	5,825	9,690	700	2,750	1,211	47,499
Apr.	20,139	9,335	10,804	3,233	789	630	494	258	3,993	5,040	5,499	736	1,014	1,323	33,810
May	26,483	10,350	16,133	3,091	654	842	494	241	4,943	5,355	10,347	717	2,602	1,135	45,994
June	22,994	16,168	6,826	3,107	963	926	494	451	5,419	5,863	13,655	725	1,399	960	40,788
July	30,481	13,383	17,098	5,129	1,043	905	593	366	5,602	7,566	11,594	698	1,264	873	52,731
Aug.	35,674	15,114	20,560	5,720	398	1,227	593	544	5,668	7,435	11,893	712	1,732	459	56,986
Sept.	29,769	11,239	18,530	4,675	457	988	594	447	4,956	6,536	9,863	969	1,614	494	50,073
Oct.	24,476	12,603	11,873	3,999	864	949	564	457	5,295	7,474	10,124	513	1,399	732	44,243
Nov.	68,135	10,436	57,699	8,005	1,048	772	564	425	4,950	7,902	7,805	943	1,790	623	92,526
Dec.	66,763	11,122	55,641	7,848	1,113	744	565	294	5,120	8,792	10,896	948	2,220	588	94,769
1929:															
Jan.	52,546	13,415	39,131	8,301	1,664	878	600	461	5,640	8,067	11,076	850	2,134	642	79,439
Feb.	47,926	12,103	35,823	7,064	1,117	955	600	495	6,572	7,511	10,384	807	2,104	520	73,982
Mar.	49,448	14,553	34,895	6,583	1,413	753	601	499	5,515	6,620	10,629	658	2,332	786	71,239
Apr.	49,816	11,414	38,402	5,097	727	747	548	306	5,997	6,645	11,321	673	1,950	549	72,982
May	43,960	15,593	28,367	5,723	800	966	548	453	6,264	6,961	13,437	650	1,922	733	66,854
June	40,398	14,344	26,054	5,563	1,122	1,061	547	422	5,582	6,693	11,270	608	1,398	543	60,868
July	46,454	15,071	31,383	5,457	974	1,247	641	462	6,422	7,192	13,995	555	1,457	543	70,228
Aug.	50,441	15,469	34,972	6,079	685	993	641	431	4,644	7,298	10,782	545	1,563	499	69,032
Sept.	53,484	12,392	41,092	7,993	384	832	640	406	4,708	7,517	10,149	755	1,566	504	76,446
Oct.	47,937	12,516	35,421	8,381	812	1,047	600*	485	4,697	8,295	10,512	893	1,606	445	73,194*
Nov.	46,279	11,204	35,075	6,660	1,065	668	600*	278	4,760	6,711	9,380	771	1,442	400*	67,810*
Dec.	48,513	13,451	35,062	8,683		930	600*	320	5,189	8,279	11,102	966	1,674	400*	

(1) Malayan net exports cannot be taken as production, since imported rubber is largely wet native rubber, which is reduced about one-third in weight by remilling; rubber exported as latex is not included which on a basis of 3½ pounds per gallon amounted to 115 tons in 1923, 1,117 in 1924, 3,618 in 1925, 3,263 in 1926, 2,439 in 1927 and 1,437 in 1928. (2) Ceylon Chamber of Commerce statistics until 1926; rubber exported as latex is not included— such shipments were equivalent to 18 tons in 1923, 93 tons 1924, 6 tons 1925, 20 tons in 1926, about ½ ton in 1927, and 1 ton in 1928. (3) Official statistics. (4) Imports into Singapore and Penang. (5) Exports from "Other D.E.I." are chiefly wet native rubber, which is reduced about one-third in weight by remilling; rubber exported as latex is not included which on a basis of 3½ pounds per gallon amounted to 2,342 tons in 1923, 1,008 tons 1924, 2,239 tons 1925, 44 tons in 1926, 84 tons in 1927, and 1,459 tons in 1928. (6) Calculated from official import statistics of principal consuming countries, viz., United States, United Kingdom, France, Germany, Belgium and Netherlands. This figure includes guayule rubber. (7) This total includes the third column for British Malaya, "Gross Exports minus Imports," and all the figures shown for the other territories. *Figure is provisional; final figure will be shown immediately it becomes available.

Net Imports of Crude Rubber into Principal Manufacturing Countries

(Long Tons)

	United States[1]	United Kingdom	France (h)	Germany	Canada (ac)	Japan (da)	Italy	Russia (ce)	Australia (ed)	Belgium (d)	Netherlands	Scandinavia (abedf)	Spain (g)	Czechoslovakia (abed)	World Total
1919	236,977	42,671	17,685	5,584	6,395	9,753	9,894	75	1,002	3,995	2,771	3,149	2,418	9	342,378
1920	248,762	56,844	13,885	11,890	11,746	5,297	6,123	62	1,815	3,840	5,510	2,292	2,008	567	370,641
1921	179,678	42,087	15,135	21,920	8,124	21,713	3,906	165	1,014	1,705	1,022	1,279	2,245	569	300,562
1922	296,267	11,724	24,352	27,546	9,207	15,934	6,430	2,498	2,648	172	-8,807	1,778	589	567	395,885
1923	300,372	12,700	27,392	18,519	18,277	15,372	8,489	2,986	1,649	2,184	792	2,528	630	1,128	408,018
1924	317,747	-11,550	30,446	22,727	14,299	19,571	8,764	2,346	3,124	2,688	-807	3,178	944	1,370	414,847
1925	381,815	4,061	32,956	33,937	19,683	11,117	11,412	7,088	4,757	2,930	875	3,149	1,155	1,558	516,493
1926	395,667	34,865	34,240	22,775	20,229	18,125	9,809	6,529	9,021	2,498	2,670	4,046	1,299	1,870	613,643
1927	398,483	60,249	34,271	38,892	26,405	20,521	11,381	12,018	9,490	6,482	636	4,224	2,055	2,672	627,789
1928	404,496	4,846	36,498	37,855	30,447	25,621	12,432	15,134	8,490	7,958	2,243	4,418	3,178	3,138	596,695
1927:															
December	28,082	309	4,696	3,108	2,302	2,710	1,462	1,453	1,242	784	-202	514	268	300	47,028
1928:															
Jan.	37,120	1,921	1,764	2,485	2,290	1,861	760	755	802	589	52	261	335	376	50,871
Feb.	30,926	3,143	2,526	2,984	2,553	1,248	437	783	616	599	98	307	296	297	46,813
Mar.	36,893	3,179	1,902	3,521	2,989	1,694	763	231	918	816	95	351	497	398	54,247
April	35,663	—2,280	2,204	2,719	1,938	2,334	1,114	1,820	832	575	280	339	304	159	48,001
May	28,660	—5,322	3,297	2,944	2,180	2,288	1,090	3,893	655	746	209	485	220	213	41,558
June	25,143	—3,031	3,597	2,968	2,186	2,102	984	4,111	348	743	135	346	251	182	40,068
July	28,170	—1,374	3,518	3,387	2,692	2,026	1,598	724	591	895	395	294	175	384	43,475
Aug.	28,827	48	3,527	2,744	2,447	1,868	875	632	707	519	316	359	58	94	43,021
Sept.	36,800	4,199	3,524	3,553	2,812	1,837	1,278	20	603	597	345	377	277	235	56,457
Oct.	41,667	—934	3,728	4,386	2,943	3,711	1,049	98	766	696	141	527	250	318	59,346
Nov.	33,846	—3,141	3,278	3,694	2,799	2,150	1,340	689	827	544	31	327	252	282	46,938
Dec.	40,781	8,438	3,635	2,470	2,618	3,002	1,145	1,378	755	639	148	435	263	200	65,905
1929:															
Jan.	53,922	11,951	5,645	4,711	3,759	3,776	1,481	956	1,061	749	218	638	179	525	89,571
Feb.	61,331	5,179	5,001	4,613	2,908	2,727	1,259	684	1,131	627	113	226	115	358	86,275
Mar.	46,391	9,068	4,409	4,586	4,961	2,630	1,515	716	725	931	316	354	80	409	77,091
Apr.	52,447	8,295	4,854	5,351	3,177	2,308	1,407	703	1,518	750	144	956	40	445	82,395
May	48,350	5,112	3,152	3,682	2,937	2,314	1,417	996	1,437	854	201	468	37	277	71,233
June	38,676	4,787	6,814	3,948	3,075	1,598	1,624	695	2,215	672	687	507	24	420	65,737
July	40,914	4,998	4,839	3,559	3,205	2,388	2,023	1,056	2,918	1,039	253	519	30	465	68,801
Aug.	35,207	14,594	4,645	4,082	2,879	3,663	908	700*	724	902	254	429	25	319	69,331*
Sept.	32,171	17,010	3,889	4,691	1,908	3,511	1,224	700*	853	672	253	361	91	477	67,811
Oct.	35,840	16,111	4,489	3,355	1,821	3,902	1,838	700*	1,125	1,147	278	710	91	201	71,608*
Nov.	40,972	13,141		3,776	2,709	3,221	1,275			361	253	595		280	
Dec.		12,434		2,921											

a—Including gutta percha. b—Including balata. c—Re-exports not deducted in monthly statistics. d—Including some scrap and reclaimed rubber. e—Official statistics of rubber imports by Soviet Russia. f—Including Norway, Sweden, Denmark and Finland. g—United Kingdom and French exports to Spain except in years prior to 1925. h—French imports have been reduced 12 per cent in order to eliminate imports of gutta percha and to reduce to basis of net weight. [1]United States imports of guayule are not included in this compilation; such imports amounted to 4,305 tons in 1926; to 5,010 tons in 1927; to 3,076 in 1928; and to 743 tons in the first 8 months of 1929. *Figure is provisional; final figure will be shown immediately it becomes available.

Domestic Production of Miscellaneous Rubber Goods

	Rubber Proofed Fabrics Yards	Rubber Heels Pairs	Rubber Soles Pairs	Mechanical Goods Shipments Dollars
1924	25,020,000	186,279,000	(1)	$48,615,000
1925	23,988,000	206,970,000	16,211,620(2)	64,877,000
1926	29,328,000	183,312,000	12,258,000	76,789,000
1927	37,872,000	201,014,000	27,160,000	68,625,000
1928	41,179,000	235,170,000	37,645,000	69,114,000
1928:				
January	2,177,000	17,682,000	3,431,000	$5,630,000
February	2,575,000	19,181,000	3,628,000	5,838,000
March	2,858,000	22,583,000	3,747,000	6,675,000
April	2,416,000	18,575,000	2,928,000	5,406,000
May	2,744,000	21,597,000	3,519,000	6,274,000
June	2,953,000	18,768,000	3,321,000	6,126,000
July	3,447,000	17,620,000	3,168,000	5,157,000
August	4,613,000	21,289,000	3,461,000	6,306,000
September	4,966,000	21,451,000	2,725,000	5,393,000
October	5,914,000	21,932,000	2,297,000	5,837,000
November	4,173,000	18,686,000	2,649,000	5,201,000
December	2,348,000	15,811,000	2,771,000	5,271,000
1929:				
January	2,828,000	19,975,000	3,876,000	6,033,000
February	3,095,000	18,979,000	2,869,000	6,135,000
March	3,952,000	17,226,000	2,746,000	7,015,000
April	4,000,000	17,256,000	2,601,000	7,035,000
May	4,860,000	19,541,000	2,916,000	7,189,000
June	4,409,000	20,007,000	2,502,000	6,792,000
July	4,260,000	19,315,000	1,295,000	6,306,000
August	5,085,000	23,095,000	2,948,000	6,792,000
September	5,507,000	21,702,000	2,841,000	5,906,000
October	6,116,000	22,386,000	3,502,000	5,887,000

(1) Not available; (2) Last 9 months only.
Source: "Survey of Current of Business of the Department of Commerce."

United States Imports of Guayule Rubber and Related Gums

(All quantities in Long Tons)

	Guayule Tons	Guayule Dollars	Balata Tons	Balata Dollars	Jelutong Tons	Jelutong Dollars	Gutta Percha Tons	Gutta Percha Dollars
1919	1,430	760,690	727	987,088	8,332	2,213,964	2,900	1,068,698
1920	758	845,985	1,064	1,260,043	5,672	2,068,501	3,183	1,520,309
1921	58	26,945	814	1,077,859	1,745	351,893	985	333,564
1922	127	57,040	812	978,765	2,335	403,812	818	281,012
1923	1,155	542,227	700	898,524	4,565	853,308	912	375,167
1924	1,356	536,392	464	568,456	6,165	1,237,100	1,408	463,610
1925	3,781	1,803,448	517	574,760	6,749	1,642,531	1,603	629,284
1926	4,305	2,562,096	354	327,218	7,263	3,127,757	1,445	661,156
1927	5,018	2,674,957	582	447,246	7,785	2,448,657	1,494	728,172
1928	3,075	1,755,685	731	430,855	7,552	2,540,059	1,597	777,128
1929	1,231	545,175	728	566,964	8,203	2,458,126	447	167,479
Jan.	—	——	46	30,374	484	152,260	138	62,950
Feb.	—	——	82	70,209	823	255,594	40	19,806
Mar.	—	——	90	75,444	428	122,026	1	1,140
Apr.	88	38,241	163	93,240	1,086	315,621	1	1,086
May	125	57,260	70	67,891	752	212,400	76	24,053
June	145	62,808	31	26,038	802	248,143	77	25,612
July	200	86,175	49	46,440	572	180,065	14	5,807
Aug	190	80,443	58	47,769	575	171,733	—	——
Sept.	107	51,156	38	30,327	913	279,225	—	——
Oct.	200	79,968	58	43,756	636	181,421	—	——
Nov.	125	47,796	13	11,600	583	182,677	49	14,935
Dec.	100	41,328	25	19,955	550	156,939	51	12,005

Reclaimed Rubber in the United States

(All Quantities in Long Tons—100% Basis)

Year	Production	Consumption Tons	Consumption % to Crude	Stocks*	Year	Production	Consumption Tons	Consumption % to Crude	Stocks*
1920	86,395	75,297	38.4	.....	1925	132,930	137,105	35.6	13,203
1921	36,725	41,351	24.1	.....	1926	180,582	164,500	45.9	23,218
1922	57,834	54,458	19.3	.....	1927	189,144	178,471	47.6	24,980
1923	74,766	69,534	22.7	.....	1928	208,516	223,000	50.4	24,785
1924	80,079	76,072	22.4	.....	1929	218,954	226,588	48.4	27,464
1927:									
Jan.	16,526	12,374	39.3	25,903	July	15,488	13,842	47.4	26,599
Feb.	15,860	14,424	47.8	27,291	Aug.	15,109	15,836	47.3	25,157
Mar.	16,788	13,528	37.4	27,124	Sept.	14,392	14,790	54.3	23,429
Apr.	14,483	16,677	46.5	25,712	Oct.	16,127	17,292	54.5	22,176
May	16,159	15,754	46.1	26,419	Nov.	15,477	14,876	55.5	21,728
June	16,652	15,547	46.0	25,811	Dec.	16,083	13,431	52.7	24,980
1928:									
Jan.	14,862	20,140	58.5	21,941	July	17,278	19,070	51.0	17,805
Feb.	15,291	18,670	55.4	20,848	Aug.	19,049	17,890	41.7	15,881
Mar.	17,069	20,690	57.9	19,558	Sept.	18,693	17,795	44.6	17,991
Apr.	15,393	19,280	58.8	19,283	Oct.	17,182	18,420	45.1	17,026
May	18,945	20,215	54.1	18,187	Nov.	18,245	18,380	49.1	22,899
June	18,781	18,140	48.2	18,709	Dec.	17,728	14,320	45.9	24,785
1929:									
Jan.	18,685	21,068	49.1	24,394	July	18,387	20,236	48.7	19,679
Feb.	18,094	19,829	47.7	23,305	Aug.	19,787	18,230	47.6	22,309
Mar.	19,984	20,867	46.7	22,076	Sept.	18,660	17,071	49.2	24,984
Apr.	19,899	22,435	47.3	20,680	Oct.	18,865	18,744	53.8	25,117
May	20,385	23,176	47.1	19,479	Nov.	14,363	15,330	55.4	26,080
June	18,416	18,141	42.0	17,980	Dec.	13,429	11,531	49.0	27,464

*Stocks on hand at the end of month or year. Exports of reclaimed rubber, not shown in this table, amounted to 8,540 tons in 1927 and 9,577 tons in 1928.

REVIEW DESK

Books, New Publications, Catalogues, Etc.

TWO-YEAR AGING TEST ON BLOOMING MOLDED TUBES. Published by E. I. du Pont de Nemours & Company, Wilmington, Del. 1929. 8 pp. For free distribution.

This report covers the results of a two-year natural aging test on two sets of 6-29 x 4.40 calendered, molded tubes, one set of which was compounded with 1 per cent of Vulcanol and cured at 292 degrees F. and the other compounded with .4375 of Vulcanol and cured at 307 degrees F.

ANNUAL REPORT OF DIRECTOR OF THE BUREAU OF STANDARDS. By George K. Burgess. Published by the Government Printing Office, Washington, D. C. 1929. 60 pp. $0.10.

Details of the more important research work done by the Bureau of Standards during the year are given in this report. Industrial research accomplished by the bureau included abrasions tests for rubber, a survey of the manufacture of sponge rubber, a report on the properties of rubber floor tile, and a study of rubber insulating materials. The Rubber Division of the American Chemical Society co-operated with the bureau and has furnished a research associate to work at the bureau.

INDEX TO A. S. T. M. STANDARDS AND TENTATIVE STANDARDS. Published by the American Society for Testing Materials, 1315 Spruce Street, Philadelphia, Pa. 1929.

This index is a compilation, under appropriate key words, of titles of all A. S. T. M. standards and tentative standards, together with the volume references to the publications in which they appear. There are fifteen listings under "Rubber Products" and many important listings under the general heading of "Textile Materials."

SYNCHRONOUS MOTORS. Published by the General Electric Company, Schenectady, N. Y. November, 1929. 90 pp. For free distribution.

A general trend toward the use of synchronous motors for rubber factory machine drives to operate at line-shaft speeds came early in the last decade along with the impetus given to the use of synchronous motors in industry at large. Descriptions and illustrations of installations in rubber factories are to be found in this volume, together with a general outline of the use of such motors.

COTTON FACTS—1929. Published by Shepperson Publishing Company, 44 Whitehall Street, New York City. 1929. 256 pp.

The extent of the use of cotton and cotton products in the rubber industry makes accurate data on that commodity almost as necessary as statistics on rubber itself. Information for the United States and other countries as well is included in this 54th edition of a standard compilation of essential figures on crops, receipts, stocks, exports, imports, visible supply, sales, prices, consumption and manufacturing output.

FOREIGN COMMERCE AND NAVIGATION OF THE UNITED STATES. Vol. 1. Published by the Government Printing Office, Washington, D. C. 1929. 661 pp. $1.50.

What has been for more than a century the standard source of reference for statistical data on American foreign trade is now again ready for distribution in its latest edition. Containing detailed data and thirty-nine statistical tables on domestic exports and imports and vessels entered and cleared, this volume is an invaluable guide for exporters, manufacturers, importers and economists.

RUBBER FACTS AND FIGURES. Published by F. C. Mathieson & Sons, 16 Copthall Avenue, London, England. 1929. 2s.

The prices of shares of rubber plantation companies and concise data on the properties, crops, capital, dividends, etc., of these companies are summarized in this 41st edition of what is now regarded as a standard publication on the subject.

LOOKING AHEAD IN AVIATION LIGHTING. By C. E. Weitz. Published by the Edison Lamp Works, Harrison, N. J. 1929. 60 pp. For free distribution.

With the purchase of airplanes by rubber companies for the use of executives and with the relation between the rubber and aviation industries growing steadily closer, a discussion of the lighting of airports and aircraft should be of general interest. Good lighting is cheap insurance, the writer of this manual points out, while remarking that last year the filming of a single motion picture employed more wattage than was being used in the lighting of all the 10,000 miles of lighted airways and in lighting all the airports of the United States.